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(54) 【発明の名称】 インクジェット記録用紙

(57) 【要約】

【課題】印字濃度、記録画質等のインクジェット記録適性に優れた、かつ、特に保存性(耐白紙黄変性)に優れたインクジェット記録用紙を提供する。

【解決手段】基材上に少なくとも1層以上のインク受容層を設け、最表面層が顔料として平均二次粒子径が0.01~1μm以下の非晶質シリカおよび接着剤を主成分とし、インク受容層の少なくとも1層中にカチオン性化合物を含有し、かつ、最表面層の表面pHが3.0~7.5であるインクジェット記録用紙。好ましくは、非

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【課題】 印字濃度、記録画質等のインクジェット記録適性に優れた、かつ、特に保存性（耐白紙黄変性）に優れたインクジェット記録用紙を提供する。

【解決手段】 基材上に少なくとも1層以上のインク受容層を設け、最表面層が顔料として平均二次粒子径が0.01～1 μm以下の非晶質シリカおよび接着剤を主成分とし、インク受容層の少なくとも1層中にカチオン性化合物を含有し、かつ、最表面層の表面pHが3.0～7.5であるインクジェット記録用紙。好ましくは、非

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【特許請求の範囲】

【請求項1】 基材と、その少なくとも一面上にインク受容層とを設けたインクジェット記録用紙において、前記インク受容層が、顔料として平均二次粒子径0.01～1μmの非晶質シリカ、および接着剤を主成分と、さらに、カチオン性化合物を含有し、かつ、前記インク受容層の表面pHが、3.0～7.5であることを特徴とするインクジェット記録用紙。

【請求項2】 基材と、その少なくとも一面上に複数のインク受容層とを設けられたインクジェット記録用紙において、前記インク受容層の最表面層が、顔料として平均二次粒子径0.01～1μmの非晶質シリカおよび接着剤を主成分とし、さらに、複数のインク受容層のいずれか1層中にカチオン性化合物を含有し、かつ、前記最表面層の表面pHが、3.0～7.5であることを特徴とするインクジェット記録用紙。

【請求項3】 前記非晶質シリカの平均一次粒子径が3～40nmであることを特徴とする請求項1または2記載のインクジェット記録用紙。

【請求項4】 75°表面光沢度(JIS-P8142)が30%以上であることを特徴とする請求項1～3のいずれかに記載のインクジェット記録用紙。

【請求項5】 前記最表面層が平滑面を転写してなる層であることを特徴とする請求項4に記載のインクジェット記録用紙。

【請求項6】 75°表面光沢度(JIS-P8142)が50%以上であることを特徴とする請求項4または5に記載のインクジェット記録用紙。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】 本発明は、インクジェット記録用紙に関し、特にインクジェット記録適性に優れ、さらに白紙の黄変が抑制されたインクジェット記録用紙に関する。また、光沢にも優れたインクジェット記録用紙に関する。

【0002】

【従来の技術】 水性インクを微細なノズルから記録体に噴出して画像を形成させるインクジェット記録方式は、記録時の騒音が少なく、カラー化が容易であること、高速記録が可能であること、また、他の印刷装置より安価

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力や温度をかけたロール間に通紙することで塗工層表面を平滑化する方法が知られている。しかしながら、このような方法では、光沢性として不十分なうえに塗工層の空隙が減少してしまうため、結晶として印字にじみという現象が生じてしまう。また、光沢性・平滑性を有するプラスチックフィルムまたは樹脂被覆紙の上に澱粉、ゼラチン、水溶性セルロース誘導体、ポリビニルアルコール、ポリビニルピロリドン等のインク吸収性樹脂によるインク受容層を設ける方法が数多く提案されているが、このような記録体は光沢性は得られるものの、インクの吸収および乾燥が遅いためハンドリング性が悪い。さらに、インク吸収ムラが発生しやすく、また耐水性およびカールも劣るという問題があった。

【0003】 これらの問題を解決できる手段として、超微粒子顔料を主成分とした塗膜が提案されている(特開平2-274857、特開平8-67064、特開平8-118790、特開平9-286162、特開平10-217601)。このうち粒子径の小さなコロイダルシリカを用いる方法(特開平2-274857、特開平8-67064、特開平8-118790)は、或る程度の光沢性、

耐水性は得られるものの、コロイダルシリカは一次粒子であるため充分な空隙が形成されず、インク吸収性は依然として満足できるものではなかった。表面光沢の高い用紙として、湿潤塗工層を鏡面を有する加熱ドラム面に圧着、乾燥することにより、その鏡面を写し取ることによって得られる、いわゆるキャスト塗工紙が知られている。このキャスト塗工紙はスーパーキャレンダー仕上げされた通常の塗工紙に比較して高い表面光沢とより優れた表面平滑性を有し、優れた印刷効果が得られることから、高級印刷物等の用途に専ら利用されているが、インクジェット記録用紙に利用した場合、種々の難点を抱えている。すなわち、一般に従来のキャスト塗工紙は、その塗工層を構成する顔料組成物中の接着剤等の成膜性物質がキャストコーターの鏡面ドラム表面を写し取ることにより高い光沢を得ている。他方、この成膜性物質の存在によって塗工層の多孔性が失われ、インクジェット記録時のインクの吸収を極端に低下させる等の問題を抱えている。そして、このインク吸収性を改善するには、キャスト塗工層がインクを容易に吸収できるようにポーラスにすることが重要であり、そのためには成膜性を減らすことが必要となるが、成膜性物質の量を減らすこ

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れた光沢とインク吸収性を兼ね備えるインクジェット記録用キャスト紙が得られることが特開平7-89220号に示されている。しかしながら、近年インクジェット記録の高速化、記録画像の高精細化、フルカラー化といった用途の拡大に伴い、さらに高画質、高記録濃度、高保存性の品質が望まれてきており、例えば銀塩方式の写真用印画紙に匹敵する様な記録品質、保存性が求められているが、このような要求を満たすには、先に提案した技術を使用しても達成が困難であるのが現状である。特に、上記した様な光沢およびインクジェット記録適性に優れたインクジェット記録用紙の場合でも、白紙部が経時や保管条件次第で、黄変するという問題が解決されていない。画像の室内保存性の改良としてカチオン化処理された顔料を用いる方法（特開平1-258980号）が提案されているが、白紙部の保存性は解決されていない。白紙部の保存性について、細孔容積が特定の範囲にある非晶質シリカを用いる方法（特開平11-342668号）は、保存性として黄変は改善されるが、光沢に優れたインクジェット記録用紙への適用は困難である。

【0005】

【発明が解決しようとする課題】本発明は、印字濃度、記録画質等のインクジェット記録適性に優れたインクジェット記録用紙に関し、特に保存性（耐白紙黄変性）に優れたインクジェット記録用紙を提供するものである。また、さらに光沢性に優れたインクジェット記録用紙を提供するものである。

【0006】

【課題を解決するための手段】本発明は上記課題を解決するため、下記の構成を採用する。即ち、本発明は、

〔1〕基材と、その少なくとも一面上にインク受容層とを設けたインクジェット記録用紙において、前記インク受容層が、顔料として平均二次粒子径0.01～1μmの非晶質シリカ、および接着剤を主成分と、さらに、カチオン性化合物を含有し、かつ、前記インク受容層の表面pHが、3.0～7.5であることを特徴とするインクジェット記録用紙。〔2〕基材と、その少なくとも一面上に複数のインク受容層とを設けられたインクジェット記録用紙において、前記インク受容層の最表面層が、顔料として平均二次粒子径0.01～1μmの非晶質シリカおよび接着剤を主成分とし、さらに、複数のインク

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〔5〕前記最表面層が平滑面を転写してなる層であることを特徴とする〔4〕に記載のインクジェット記録用紙。

〔6〕75°表面光沢度（JIS-P8142）が50%以上であることを特徴とする〔4〕または〔5〕に記載のインクジェット記録用紙。

【0008】

【発明の実施の形態】白紙の黄変には、様々な要因が考えられ、長期間での変色には、光、熱、湿度、オゾンやNOX等のガス等が考えられるが、室内の冷暗所に保管しても、短期間に著しい黄変が発生することがあった。特にクリアーホルダーや名刺ホルダー等のプラスチックファイル中に保管された場合、粘着テープを用紙表面または裏面に貼り付けた場合、ゴム板上に放置した場合等顕著な黄変が見られた。これらの黄変の原因としては、プラスチックやゴムに微量含有される酸化防止剤等が、インクジェット記録用紙の記録層中のシリカ等の顔料に吸着され、酸素等により酸化された結果、黄変するものと推定される。また、カチオン性化合物の存在も影響しているものと推定される。

【0009】本発明者等の検討の結果、カチオン性化合物（カチオン樹脂）を配合した場合、黄変が発生し易い傾向にあることが明らかになった。一方、高い印字濃度、印字耐水性の付与等、印字品位を高めるためにはカチオン性化合物の配合が必須である。さらに、上記現象は、高記録濃度を付与する目的、あるいは表面光沢を付与する目的で、記録層に微細な顔料を使用したインクジェット記録用紙の場合、特に顕著であることが判明した。この理由はインク吸収性の良好な、特定の平均粒子径を有する（微多孔性の）微細顔料は、酸化防止剤等を吸着する能力が高いこと、受容層の透明性が高く黄変が目立ち易いことが原因と推定される。すなわち、高いインクジェット記録特性、光沢を得るためには、下述する様な、平均二次粒子径が1μm以下の微細顔料、とりわけ一次粒子が凝集した二次粒子の平均二次粒子径0.01～1μmの微細顔料、特に平均一次粒子径が4～30nmの微細顔料を使用することが好ましいが、このような微細顔料のみを使用した場合、白紙黄変がより起き易い傾向にある。

【0010】ところで、カチオン性化合物を配合しても

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する材料を塗工・含浸することが挙げられる。このような要件を満たす紙原紙としては、硫酸バンドを含有するパルプスラリーより抄造された、いわゆる酸性紙が好適である。一般に酸性紙は、表面pHが2.0～6.0程度である。また、硫酸バンドを含有しない所謂中性紙でも、表面に酸性物質を塗布する等により、表面pHを6.0以下に調整しても良い。基材として、紙原紙上に顔料を含有する塗工層を設けた一般印刷用の塗工紙を用いることもでき、この場合も表面pHが5.0以下に調整されたものを使用することができる。酸性原紙を用いた塗工紙は、一般に表面pHが3.0～6.0程度である。最表面層の表面pHが3.0未満にするには、表面pHの極度に低い酸性原紙を用いて、基材表面に強酸性物質を含有する材料を塗工・含浸することが必要であり、インクジェット記録用紙そのものの保存性が低いものとなり好ましくない。

【0011】また、基材として、紙表面にポリオレフィン樹脂を被覆した所謂RC紙を使用した場合、基材へのインクの浸透が無い為、インク吸収による記録用紙のボコツキ現象、通称コックリング称する現象が発生せず、表面光沢が発現しやすい。また写真印画紙と同等の風合いが得られる。銀塩方式の写真印画紙に使用されるRC紙は、表面塗工剤の接着性を高める目的で、ゼラチン等を塗工している。このようなRC紙の表面pHは、6.0～7.0程度である。プラスチックフィルム等を基材に使用する場合、表面pHは中性である場合が多く、この場合は、表面に酸性物質を塗工し、表面pHを調整することができる。以下基材について更に詳細に述べる。

【0012】〔基材〕本発明において使用する基材は、吸収性基材、非吸収性基材のいずれでもよい。吸収性基材を用いた場合は、基材自体がインク吸収性を有するため、インク受容層の塗工量を多くしなくても良い。また、後述する様に、キャスト法等の転写方式により、最表面層を形成する場合、基材に通気性があるため、製造が容易になる。非吸収性基材を用いた場合は、記録体のコックリングがないものが得られるため好ましい。また表面平滑性、表面光沢性を向上させるなどの観点からは、プラスチックフィルム類や、写真印画紙用紙（RC紙）の様な樹脂被覆紙が好ましい。プラスチックフィルム類やRC紙を用いた場合、転写方式によらずとも、

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ブ、機械パルプ、再生パルプ等を使用することができ、これらのパルプは、紙力、抄紙適性等を調整するために、叩解機により叩解度を調整できる。パルプの叩解度（フリーネス）は特に限定しないが、一般に250～550m1（カナダ標準水度：JISP-8121、以下CSFと称する）程度である。顔料は不透明性等を付与したり、インク吸収性を調整する目的で配合し、炭酸カルシウム、結晶カオリン、シリカ、酸化チタン等を使用できる。この場合、配合量は1～20%程度が好ましい。多すぎると紙力が低下する恐れがある。助剤としてサイズ剤、定着剤、紙力増強剤、カチオン化剤、歩留り向上剤、染料、蛍光増白剤等を添加することができる。さらに、抄紙機のサイズプレス工程において、デンプン、ポリビニルアルコール、カチオン樹脂等を塗布・含浸させ、表面強度、サイズ度等を調整できる。サイズ度は1～200秒程度が好ましい。サイズ度が1秒より低いと、塗工時に皺が発生する等操業上問題となる場合があり、サイズ度が200秒より高いとインク吸収性が低下したり、印字後のカールやコックリングが著しくなる場合がある。紙基材の坪量は、特に限定されないが、20～400g/m²程度が好ましい。また、紙厚は20～400μm程度、張力は0.6～1.2g/cm²程度が好ましい。

【0014】（非吸収性基材）非吸収性基材としては、例えば、透明、不透明いずれの基材も選ばず、セロハン、ポリエチレン、ポリプロピレン、軟質ポリ塩化ビニル、ポリエステル、ポリカーボネート、ポリスチレンなどのプラスチックフィルム類、あるいは吸収性、非吸収性のいずれより選ばれる前記記載のプラスチックフィルム類、樹脂フィルム、合成紙、パルプを主成分とする基材（例えば、上質紙、中性紙、印画紙原紙、アート紙、コート紙、キャスト塗工紙、クラフト紙、含浸紙等）などを、非吸収性樹脂で被覆した樹脂被覆体などが適宜使用される。被覆用樹脂としては、ポリエチレン系樹脂、ポリプロピレン系樹脂、ポリエステル系樹脂、ポリオレフィン系樹脂、ポリカーボネート系樹脂など、またはそれらの混合物を主成分とするものを用いることができる。ポリエチレン系樹脂としては、低密度ポリエチレン樹脂、高密度ポリエチレン樹脂、直鎖状低密度ポリエチレン樹脂などがある。ポリエステル系樹脂としては、ポ

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また銀塩写真ライクな風合い（特に白色度、手触り）が得られにくいことを、主成分がパルプからなり高平滑性を有する上質紙、印画紙原紙、アート紙、コート紙、キャスト塗工紙にポリエチレン系樹脂、ポリプロピレン系樹脂、ポリエステル系樹脂、ポリオレフィン系樹脂、ポリカーボネート系樹脂など、またはそれらの混合物を主成分とするもので高平滑性を有するように被覆した樹脂被覆紙を使用することができる。

【0016】特に、印画紙原紙にポリエチレン系樹脂などのポリオレフィン系樹脂で高平滑性を有するように被覆した樹脂被覆紙（RC紙）が特に好ましい。樹脂被覆は、熱溶融したポリオレフィン系樹脂をダイヘッドより押出し塗工し、直ちにクーリングロールで冷却・固化することにより行われる。インク受容層を設ける側の樹脂被覆層は、高平滑性を得るため、鏡面あるいはそれに近ずる平滑面を有するクーリングロールを使用するのが良い。また、写真印画紙調の風合い（特に手触り感）を得るため、記録体のカールを制御するためなどの理由から記録面と反対側の面（裏面）もポリエチレン系樹脂あるいはその他のポリオレフィン系樹脂で被覆することが好ましい。裏面の樹脂被覆層は、印画紙の風合いを持たせるため、およびプリンター搬送性を付与するため、マット面にするのが好ましく、マット面を有するクーリングロールを使用するのが良い。

【0017】樹脂被覆層の厚さは特に限定されないが、4～100 μm の範囲とすることが好ましい。好ましくは5～50 μm 、より好ましくは7～35 μm である。少なすぎると被覆の効果が不足し、多すぎると風合いが劣る。記録体のカールを考慮し、記録面と裏面の樹脂被覆厚を調整したり、被覆用樹脂を選択することも可能である。被覆用樹脂に白色顔料好ましくは酸化チタン顔料、炭酸カルシウム、合成シリカ、あるいはこれらを併用したものを含有させることも可能である。酸化チタン顔料がもっとも好ましい。

【0018】基材に非吸収性基材を用いた場合、記録面側に基材と記録層の密着性を付与あるいは向上させるなどの目的で予め密着処理、接着処理を施しておくことも可能である。特に樹脂被覆紙を用いた場合、コロナ放電処理を施すこと、ゼラチン、ポリビニルアルコールなどによるアンダーコート層を設けることが好ましい。基材

る。

【0020】[インク受容層]次にインク受容層について述べる。インク受容層は、顔料と接着剤とカチオン性化合物を主成分とする。カチオン性化合物は、インク受容層を1層以上設ける場合、少なくともその内の1層に含有されれば良いが、印字濃度を高くする目的では、できるだけ上の層、できれば最表面層に配合するのが好ましい。

【0021】（微細顔料）高い印字濃度および高光沢を得るために、本発明のインク受容層の最表面層に平均二次粒子径が0.01～1 μm の微細顔料として、平均一次粒子径が3～40nm、平均二次粒子径が0.01～1 μm の非晶質シリカを使用するとインクの吸収性・定着性に優れるため、好ましい。

【0022】尚、特に透明性の高い非晶質シリカとして、フュームドシリカが挙げられる。フュームドシリカは原料となる四塩化珪素の純度を蒸留により比較的高くすることができ、さらにクローズドシステムの製造工程が可能のため製造工程においても不純物の混入を防ぐことが可能である。このような純度の高いフュームドシリカを含有すると高印字濃度、高光沢を得ることが可能である。

【0023】また、非晶質シリカと併用できる微細顔料としては、例えば、コロイダルシリカ、コロイダルアルミナのような微細粒子が挙げられるが、上記の微細顔料は、一次粒子、好ましくは平均一次粒子径3～40nmの一次粒子が凝集した平均二次粒子径が1 μm 以上の二次粒子を粉砕・分散して得ることができる。この様な二次粒子として具体的には、アルミナ（酸化アルミニウム）、カオリン、クレイ、焼成クレイ、酸化亜鉛、酸化スズ、硫酸マグネシウム、水酸化アルミニウム、炭酸マグネシウム、サチンホワイト、ケイ酸アルミニウム、スメクタイト、ゼオライト、ケイ酸マグネシウム、炭酸マグネシウム、酸化マグネシウム、珪藻土、スチレン系プラスチックピグメント、尿素樹脂系プラスチックピグメント、ベンゾグアナミン系プラスチックピグメント等の一般塗工紙製造分野で公知公用の各種顔料が挙げられる。これらは、1種もしくはそれ以上、併用することが出来る。

【0024】これらの二次粒子を、平均二次粒子径が1

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【0025】尚、インク受容層が1層の場合および2層以上の場合の最表面層に、本発明で規定する微細顔料以外に他の顔料を含有してもよい。例えば、平均二次粒子径が1 μ mより大きい、アルミナ、カオリン、クレー、焼成クレー、酸化亜鉛、酸化スズ、硫酸マグネシウム、水酸化アルミニウム、擬ペーナイト、炭酸カルシウム、サチンホワイト、ケイ酸アルミニウム、スメクタイト、ゼオライト、ケイ酸マグネシウム、炭酸マグネシウム、酸化マグネシウム、珪藻土、スチレン系プラスチックビグメント、尿素樹脂系プラスチックビグメント、ベンゾグアナミン系プラスチックビグメントなど、一般に塗工紙分野で公知公用の各種顔料が適宜使用される。この場合、高インク吸収性、高印字濃度および高光沢を得るためには、その配合量は50%以下さらに好ましくは20%以下とするのが望ましい。

【0026】本発明のインク受容層が2層以上の場合、最表面層以外の層には、例えば、平均粒子径が1 μ mより大きい、非晶質シリカ、アルミナ、カオリン、クレー、焼成クレー、酸化亜鉛、酸化スズ、硫酸マグネシウム、水酸化アルミニウム、擬ペーナイト、炭酸カルシウム、サチンホワイト、ケイ酸アルミニウム、スメクタイト、ゼオライト、ケイ酸マグネシウム、炭酸マグネシウム、酸化マグネシウム、珪藻土、スチレン系プラスチックビグメント、尿素樹脂系プラスチックビグメント、ベンゾグアナミン系プラスチックビグメントなど、一般に塗工紙分野で公知公用の各種顔料が適宜使用される。また、前記顔料を微細化して使用してもよい。

【0027】本発明でいう平均粒子径とは、全て電子顕微鏡（SEMまたはTEM）で観察した粒子径である

（1万～40万倍の電子顕微鏡写真を撮り、5cm四方中の粒子のマーチン径を測定し、平均したもの。「微粒子ハンドブック」（朝倉書店）のP52、1991年等に記載されている。）本発明で好ましく用いられる微細顔料の平均二次粒子径は、0.01～1 μ m以下である。より好ましくは、0.01～0.5 μ mであり、さらに好ましくは0.015～0.3 μ mである。下述するような、カチオン性化合物と複合化された微細顔料の場合も好適な平均二次粒子径は同様である。微細顔料の2次粒子の平均二次粒子径が1 μ mを越えると、インク受容層の透明性が低下し、インク受容層中に定着された染料

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nmを越えると、凝集した2次粒子が大きくなり、インク受容層の最表面層の透明性が低下し、インク受容層の最表面層中に定着された染料の発色性が低下し、所望とする印字濃度が得られ難くなる。インク受容層の最表面層中の全顔料における微細顔料の比率は、透明性を維持するために、50%以上が望ましい。全顔料中の微細顔料の比率が50%未満になると透明性の低下が著しく、印字濃度等の画像品位が低下する場合もある。

【0029】（カチオン性化合物の配合）インク受容層の少なくともいずれかの層には、インク中のアニオン性染料成分を定着させる目的でカチオン性化合物が配合されることが好ましい。高い印字濃度を得るためには、インク染料をできるだけ表面近傍で定着させるのが望ましく、最表面層または最表面層に近い層にカチオン性化合物が配合するのが良い。配合の方法は、前記顔料に混合すれば良いのだが、特に微細顔料の場合は、混合の際凝集が起こる場合がある。また、例えば非晶質シリカは一般にアニオン性であり、より凝集が起き易い。この場合、①顔料にカチオン性化合物を添加した後、粉碎・分散、または②顔料を或る程度粉碎・分散した後、カチオン性化合物を添加し、さらに粉碎・分散するのが好ましい。この結果、少なくともその一部はカチオン性化合物と複合化した形態で存在する。特に微細顔料の場合は、カチオン性化合物は上述した様に、粉碎・分散の過程で配合し、全部あるいは一部複合化するのが望ましいが、印字耐水性、印字濃度、印字にしみ等の品質を調整する目的で、カチオン化処理微細顔料にさらにカチオン性化合物を配合することができる。この場合、処理微細顔料がカチオン化されているため、更にカチオン性化合物を追加配合しても凝集が起こり難い。

【0030】（カチオン性化合物）カチオン性化合物としては、カチオン樹脂や低分子カチオン性化合物（例えばカチオン性界面活性剤等）が挙げられる。印字濃度向上の効果の点ではカチオン樹脂が好ましく、水溶性樹脂あるいはエマルジョンとして使用できる。更にカチオン樹脂を架橋等の手段により不溶化し、粒子状の形態としたカチオン性有機顔料としても使用できる。このようなカチオン性顔料は、カチオン樹脂を重合する際、多官能性モノマーを共重合し架橋樹脂とする、あるいは反応性の官能基（水酸基、カルボキシル基、アミノ基、アセト

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アミド-ホルマリン重縮合物に代表されるジシアン系カチオン樹脂、5) ジシアンジアミド-ジエチレントリアミン重縮合物に代表されるポリアミン系カチオン樹脂、6) エピクロロヒドリン-ジメチルアミン付加重合物、7) ジメチルジアリルアンモニウムクロライド共重合物、8) ジアリルアミン塩共重合物、9) ジメチルジアリルアンモニウムクロライド重合物、10) アリルアミン塩の重合物、11) ジアルキルアミノエチル(メタ)アクリレート4級塩重合物、12) アクリルアミド-ジアリルアミン塩共重合物等のカチオン性化合物があげられる。低分子カチオン性化合物としては、第1級アミノ基、第2級アミノ基、第3級アミノ基、第4級アンモニウム塩基を有する低分子化合物であり分子量1000程度以下のものがあげられる。カチオン性化合物、すなわちカチオン樹脂や低分子カチオン性化合物は、カチオン性化合物を配合する層の全顔料100重量部に対し、1~100重量部、より好ましくは5~50重量部の範囲で使用することができる。配合量が少ないと印字耐水性、印字濃度等向上の効果が得られにくく、多いと逆に印字濃度が低下したり、画像のニジミが発生する場合がある。

【0032】(接着剤) 接着剤としては、水溶性樹脂(例えばポリビニルアルコール、ポリビニルピロリドン、カゼイン、大豆蛋白、合成蛋白質類、澱粉、カルボキシルメチルセルロースやメチルセルロース等のセルロース誘導体)、スチレン-ブタジエン共重合体、メチルメタクリレート-ブタジエン共重合体等の共役ジエン系重合体ラテックス、スチレン-酢酸ビニル共重合体等のビニル系共重合体ラテックス等の水分散性樹脂、水性アクリル樹脂、水性ポリエステル樹脂、水性ポリウレタン樹脂等その他一般に塗工紙分野で公知公用の各種接着剤を、本発明の効果を阻害しない範囲で配合することができる。接着剤の配合量は全顔料100重量部に対し1~200重量部、より好ましくは10~100重量部の範囲で調節される。ここで接着剤の量が少ないと、所望の効果が得られにくく、さらに塗工層の強度が弱くなり表面が傷つきやすくなったり、粉落ちが発生する場合がある。逆に多いと、インク吸収性が低下し、所望のインクジェット記録性が得られなくなる場合がある。

【0033】(離型剤等) 下述するように、転写方式に

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部、好ましくは0.5~30重量部、より好ましくは1~20重量部の範囲で調節される。ここで配合量が少ないと、離型性改善の効果が得られにくく、多いと逆に光沢が低下したり、インクのハジキや記録濃度の低下が生じる場合がある。

【0034】インク受容層塗工組成物中には白濁度、粘度、流動性等を調節するために、一般の印刷用塗工紙やインクジェット用紙に使用されている顔料、消泡剤、着色剤、蛍光増白剤、帯電防止剤、防腐剤及び分散剤、増粘剤等の各種助剤が適宜添加される。

【0035】(インク受容層の最表面層の紙面pH調整) 本発明において、インク受容層の最表面層の表面のpHが3.0~7.5である必要がある。このような状態にするには、例えば塗工組成物のpHを調整することにより達成される。この場合、最表面層塗工組成物のpHとしては、3.0~8.0程度、好ましくは4.0~7.0程度が適当である。ただし、最表面層表面のpHは、インク受容層の最表面層用塗工組成物のpHだけではなく、基材表面のpHや、下塗層を設けた場合、下塗層の表面pHや下塗層塗工組成物のpHにも影響される。尚、前記最表面層塗工組成物のpHが3.0未満では、塗工組成物が凝集する場合があり、光沢が発揮されなかったり、印字品位が低下したりする場合がある。また、前記最表面層塗工組成物のpHが8.0を超える場合、下塗層のpHを低くしなければならず、その場合にも下塗層の塗工組成物のpHが3.0未満では、塗工組成物が凝集する場合があり、光沢が発揮されなかったり、印字品位が低下したりする場合があるため、所望の表面pHが得られない場合がある。

【0036】塗工組成物のpHを3.0~8.0程度とするためには、顔料を選択することが挙げられる。例えば、アルミナ等の顔料は酸性すなわちpH7.0以下の値を示す。また、シリカ、ゼオライト等は一般に、アルカリ性すなわちpH7.0以上の値を示す場合が多いが、カチオン樹脂の種類を選択したり、酸等のpH調整剤を配合することにより、所望のpHの塗工液とすることができる。カチオン樹脂のpHは一般に2.0~8.0程度であるが、カチオン樹脂の種類や配合量を検討することにより、所望の紙面pHを得ることが可能である。ただし、過度にpHの低いカチオン樹脂や配合量を過

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質が得られない場合もある。

【0038】〔製造方法〕プラスチックフィルムやRC紙等の平滑性の特に高い基材を使用し、特に顔料として、例えば平均二次粒子径が300nm以下の微細顔料を使用した場合、光沢が発揮され易い。また、スーパーカレンダー処理（熱スーパー）等によりさらに光沢を向上させることもできる。また、通常の（平滑性のあまり高くない）原紙を使用した場合でも、最表面層を転写方式で形成させると特に光沢が発現し易い。

【0039】（転写法）転写法とは、塗工層を、平滑性を有するキャストドラム（鏡面仕上げした金属、プラスチック、ガラス等のドラム）、鏡面仕上げした金属板、プラスチックシートやフィルム、ガラス板等上で乾燥し、平滑面を塗工層上に写し取ることにより、平滑で光沢のある塗工層表面を得る方法である。

【0040】（キャスト法）転写法によりインク受容層の最表面層を設ける方法としては、塗工液を基材上（下塗り層を設けた場合はその上）に塗工して、該塗工層が湿潤状態にある間に加熱された鏡面ドラム等に圧接、乾燥して仕上げる方法（ウェットキャスト法）、あるいは一旦乾燥後再湿潤した後加熱された鏡面ドラム等に圧接、乾燥して仕上げる方法（リウェットキャスト法）が挙げられる。また加熱された鏡面ドラム等に直接塗工液を塗工した後、基材上（下塗り層を設けた場合はその上）に圧接、乾燥して仕上げる方法（プレキャスト法）も採用することができる。

【0041】さらに、塗工液を基材上（下塗り層を設けた場合はその上）に塗工して、この塗工層をある程度乾燥し、半乾燥の状態にある間に、加熱された鏡面ドラム等に圧接、乾燥して仕上げる方法が挙げられる。ここで半乾燥とは、塗工層の流動性はほとんど無くなっているが、水分は多く含んでいる状態を意味し、塗工層総乾量に対して20～400%（即ち塗工層の総乾重量100重量部に対し20～400重量部の水分を含む）程度に調整される。

【0042】塗工液を基材上（下塗り層を設けた場合はその上）に塗工して、塗工層が湿潤状態にある間に加熱された鏡面ドラム等に圧接、乾燥して仕上げる場合、均一で十分な塗工量の塗工層を得る目的で、塗工液の不動化を促進する方法を経ることもできる。この方法として

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およびそれらの塩、アルデヒド化合物、エポキシ化合物等が挙げられる。

【0043】（フィルム転写法）転写法によりインク受容層の最表面層を設ける別な方法としては、フィルム転写法が挙げられる。フィルム転写法には、（1）塗工液を基材上（下塗り層を設けた場合はその上）に塗工して、該塗工層が湿潤状態にある間に、あるいは一旦乾燥後再湿潤した後、平滑なフィルム・シートを重ね、そのまま乾燥後、平滑なフィルム・シートを剥がす方法、

（2）塗工液を平滑なフィルム・シート上に塗工して、該塗工層が湿潤状態にある間に、あるいは一旦乾燥後再湿潤した後、基材または下塗り層面を重ね、そのまま乾燥後、平滑なフィルム・シートを剥がす方法、がある。

また、（1）および（2）において、フィルム・シートを重ねた状態で、乾燥せずあるいは一部乾燥した後（フィルム・シートが剥離可能な場合）、フィルム・シートを剥離し、さらに完全に乾燥することもできる。

【0044】（塗工方法）前述した受容層を塗工する場合、ブレードコーター、エアナイフコーター、ロッドブレードコーター、ロールコーター、ブラシコーター、チャンプレックスコーター、バーコーター、グラビアコーター、ダイコーター、カーテンコーター等の各種公知の塗工装置が使用できる。受容層最表面層の塗工量は、下層の塗工量にもよるが、乾燥固形分で1～50g/m²、好ましくは、2～30g/m²、より好ましくは、3～20g/m²である。ここで、1g/m²未満では印字濃度や光沢が十分に出ない場合があり、50g/m²を越えて多いと効果は飽和し、コスト的にも不利となる。

【0045】（下塗り）インク受容層は2層以上設けることができる。最表面層以外の層を下塗り層と称する。下塗り層は、顔料と接着剤を主成分として構成される。下塗り層中の顔料は、微細顔料を使用しても良いが、粒子径は最表面層で用いたものより大き目のものを使用しても良い。下塗り層を2層以上設け、最表面層に微細顔料を用いた場合、少なくとも最下層は、最表面層で用いたものより大き目のものを使用するのが好ましい。この場合、吸収容量、吸収速度に優れやすい。転写方式を採用せずに光沢を得るためには、下塗り層表面の平滑性が或る程度高い必要があるので、下塗り層の顔料の平均二次粒子径は1μm以下が好ましい。

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で公知公用の各種顔料が1種もしくはそれ以上、併用することが出来る。これらの中でも、インク吸収性の高い非晶質シリカ、アルミナ、ゼオライトを主成分として使用するのが好ましい。

【0047】下塗層接着剤としては、カゼイン、大豆蛋白、合成蛋白等の蛋白質類、澱粉や酸化澱粉等の各種澱粉類、ポリビニルアルコール、カルボキシメチルセルロースやメチルセルロース等のセルロース誘導体、スチレン-ブタジエン共重合体、メチルメタクリレート-ブタジエン共重合体の共役ジエン系重合体ラテックス、アクリル系重合体ラテックス、エチレン-酢酸ビニル共重合体等のビニル系重合体ラテックス、等一般に塗工紙用として用いられている従来公知の接着剤が単独、あるいは併用して用いられる。顔料と接着剤の配合割合は、その種類にもよるが、一般に顔料100重量部に対し接着剤1~100重量部、好ましくは2~50重量部の範囲で調節される。その他、一般塗工紙の製造において使用される分散剤、増粘剤、消泡剤、帯電防止剤、防腐剤等の各種助剤が適宜添加される。下塗り層中には蛍光染料、着色剤を添加することもできる。

【0048】下塗層中には、インクジェット記録用インク中の染料成分を定着する目的で、カチオン性化合物を配合することができる。下塗層中の顔料の粒子径がある程度大きい場合、インク染料は下塗り層上に設ける最表面層にできるだけ定着させた方が、印字（記録）濃度が高くなる傾向であり、このためには、下塗り層中よりも最表面層中にカチオン性化合物を多く配合するのが好ましい。下塗層中の顔料の粒子径が十分小さく透明性が高い場合は、下塗層中で定着されても印字濃度が低下し難いため、下塗層中にカチオン性化合物を配合しても問題とならない。

【0049】白紙黄変は、最表面層の表面pHが重要であり、下層のpHについては特に限定されないが、基材表面pHおよび下層表面pHが最表面層の表面pHに影響を与えるため、適宜調整する必要がある。

【0050】上記材料をもって構成される下塗層用組成物は、一般に固形分濃度を5~50重量%程度に調整し、基材上に乾燥量で2~100g/m²、好ましくは5~50g/m²程度、更に好ましくは10~30g/m²程度になるように塗工する。ただし、下塗層を2

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【0051】〔インク〕本発明のインクジェット記録方法で使用されるインクとしては、像を形成させる色素と該色素を溶解あるいは分散する溶媒を必須成分とし、必要に応じて各種分散剤、界面活性剤、粘度調整剤、比抵抗調整剤、pH調整剤、防かび剤、記録材の溶解あるいは分散安定化剤などの各種助剤が適宜添加される。インクに使用される記録剤としては、直接染料、酸性染料、塩基性染料、反応性染料、食用色素、分散染料、油性染料及び各種顔料などが挙げられるが、従来公知の記録剤は特に制限なく使用できる。上記色素の含有量は、溶媒成分の種類、インクに要求される特性などにより決定されるが、本発明におけるインクにおいても、従来のインク中の配合、つまり0.1~20重量%程度の使用で特に問題はない。

【0052】本発明で用いられるインクの溶媒としては、水及び水溶性の各種有機溶剤、例えば、メチルアルコール、エチルアルコール、n-プロピルアルコール、イソプロピルアルコール、n-ブチルアルコール、イソブチルアルコールなどの炭素数1~4のアルキルアルコール類、アセトン、シアセトンアルコールなどのケトンあるいはケトンアルコール類、ポリエチレングリコール、ポリプロピレングリコールなどのポリアルキレングリコール類、エチレングリコール、プロピレングリコール、ブチレングリコール、トリエチレングリコール、チオジグリコール、ヘキシレングリコール、ジエチレングリコールなどのアルキレン基が2~6個のアルキレングリコール類、ジメチルホルムアミドなどのアミド類、テトラヒドロフランなどのエーテル類、グリセリン、エチレングリコールメチルエーテル、ジエチレングリコールメチル（エチル）エーテル、トリエチレングリコールモノメチルエーテルなどの多価アルコールの低級アルキルエーテル類などがある。

【0053】上記は、染料インクについて述べたが、近年顔料タイプのインクも普及してきている。顔料インクは、発色の鮮明性が染料インクより一般に劣るが、記録画像の耐水性、耐光性に優れる長所を有する。顔料インクとは、溶媒、即ち水または/及び有機溶媒に、有機または無機顔料粒子成分を分散させたインクである。

【0054】有機溶媒としては例えば、メチルアルコール、エチルアルコール、n-プロピルアルコール、イソ

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フラン等のエーテル類、グリセリン、エチレングリコールメチルエーテル、ジエチレングリコールメチル（エチル）エーテル、トリエチレングリコールモノメチルエーテル等の多価アルコールの低級アルキルエーテル類、

（イソ）パラフィン系炭化水素類などが挙げられる。上記の中で、水を主成分とする溶媒を用いたものが水性顔料インク、油性溶媒を主成分としたものが油性顔料インクである。

【0055】有機顔料としては、例えば、アゾ系、フタロシアン系、ベルリン系、イソインドリノン系、イミダゾロン系、ピランスロン系、チオインジゴ系等の顔料が例示でき、無機顔料としては例えば、カーボンブラック、グラファイト、合成酸化鉄黄、透明ベンガラ、チタンイエロー、モリブデートオレンジ、亜酸化銅、コバルトブルー、群青、C. i. Pigment Yellow（イエロー）、C. i. Pigment Blue（シアン）、C. i. Pigment Red（マゼンタ）等の顔料が例示できる。

【0056】前記分散剤としては、各種界面活性剤、低分子量分散剤、親水性官能基と疎水性官能基を有する樹脂系の分散剤が用いられる。またインクの粘度を調節する目的や定着性を向上させる目的で水性樹脂を添加することもできる。

【0057】前記顔料と分散剤を溶液中に配合し、ペイントシェーカー、サンドミル等の分散機を用いて微細な分散粒子に粉碎し、孔径1.0 μm 以下のフィルターにて粗大粒子の過剰を行い顔料インクとすることが通常行われている。顔料インクの固形分濃度は、特に限定しないが0.5～30重量%である。また顔料インク中に分散された顔料の平均粒子径は一般に50～500 nm程度である。

【0058】

【実施例】以下に実施例を挙げて、本発明をより具体的に説明するが、勿論これらに限定されるものではない。また、例中の部および%は特に断らない限り、それぞれ重量部および重量%を示す。

【0059】〔基材の作製〕

（支持体A）広葉樹晒クラフトパルプ（LBKP；CSF500ml）100部、アンシレックス（焼成カオリン）10部、市販サイズ剤0.05部、硫酸バンド1、

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ク酸系中性サイズ剤0.2部よりなる濃度0.5%のバルブスラリーを調製した。このバルブスラリーを長網抄紙機にて抄紙し、ドライヤー、マシンカレンダーを通し、坪量120 g/m^2 、緊度0.80 g/cm^2 の紙基材を製造した。この紙基材のステキヒトサイズ度は50秒であった。この紙基材の表面pHは8.0であった。

【0061】（支持体C）CSF（JIS P-8121）が250 mlまで叩解した針葉樹晒クラフトパルプ（NBKP）と、CSFが280 mlまで叩解した広葉樹晒クラフトパルプ（LBKP）とを、重量比2：8の割合で混合し、濃度0.5%のバルブスラリーを調製した。このバルブスラリー中にバルブ乾燥重量に対しカチオン化澱粉2.0%、アルキルケテンダイマー0.4%、アニオン化ポリアクリルアミド樹脂0.1%、ポリアミドポリアミンエピクロルヒドリン樹脂0.7%を添加し、十分に撹はんして分散させた。上記組成のバルブスラリーを長網マシンで抄紙し、ドライヤー、サイズプレス、マシンカレンダーを通し、坪量180 g/m^2 、緊度1.0 g/cm^2 の原紙を製造した。上記サイズプレス工程に用いたサイズプレス液は、カルボキシル変性ポリビニルアルコールと塩化ナトリウムとを2：1の重量比で混合し、これを水に加えて加熱溶解し、濃度5%に調製したもので、これを紙の両面にトータルして25 ml/m^2 塗布して原紙を得た。

【0062】この原紙の両面にコロナ放電処理を施した後、バンバリーミキサーで混合分散した下記のポリオレフィン樹脂組成物1（表面用樹脂組成物）を原紙のフェルト面側に塗工量が25 g/m^2 になるようにして、またポリオレフィン樹脂組成物2（裏面用樹脂組成物）をワイヤー面側に塗工量が20 g/m^2 になるようにして、T型ダイを有する溶融押し出し機（溶融温度320℃）で塗布し、フェルト側を鏡面、ワイヤー側を粗面のクーリングロールで冷却固化した。次に、表面鏡面上にコロナ放電処理を施した後、下記アンカー層を乾燥重量で0.3 g/m^2 になるようグラビアコーターにて塗工した。得られた支持体Aは、表面側の平滑度（玉研式、J.TAPPI No.5）が6000秒、不透明度（JIS P8138）が93%、表面pHは6.5であった。

【0063】（ポリオレフィン樹脂組成物1）長鎖型低粘度ポリエチレン樹脂（粘度0.926 cP/cm^2 、 η

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リエチレン樹脂（密度0.954 g/cm³、メルトインデックス20 g/10分）65部、低密度ポリエチレン樹脂（密度0.924 g/cm³、メルトインデックス4 g/10分）35部

【0065】（アンカー層）ゼラチン（新田ゼラチン社製、商品名：G0282K）100部、界面活性剤（花王社製、商品名：エマルE27C）0.005部

【0066】〔シリカ微細顔料の調製〕

（微細顔料A）市販沈降法シリカ（トクヤマ社製、商品名：ファインシール X-45、平均一次粒子径：約10 nm、平均二次粒子径：約4.5 μm）をサンドグラインダーにより水分散粉砕した後、ナノマイザー（ナノマイザー社製、商品名：ナノマイザー）を用いて粉砕分散を繰り返し、分級後、平均二次粒子径が0.08 μmからなる10%分散液を調製した。

【0067】（微細顔料A1）市販沈降法シリカ（トクヤマ社製、商品名：ファインシール X-45、平均一次粒子径：約10 nm、平均二次粒子径：約4.5 μm）をサンドグラインダーにより水分散粉砕した後、ナノマイザー（ナノマイザー社製、商品名：ナノマイザー）を用いて粉砕分散を繰り返し、分級後、平均二次粒子径が0.05 μmからなる12%分散液を調製した。該分散液にカチオン樹脂（日東紡績社製、商品名：PAS-J-81）5部を添加し、顔料の凝集と分散液の増粘を起こさせた。再度、ナノマイザーを用いて粉砕分散を繰り返し、平均二次粒子径（凝集粒径）が0.08 μmからなる10%分散液を調製した。

【0068】（微細顔料A2）添加するカチオン樹脂の量を10部とした以外は、微細顔料A1と同様にして調製した。

【0069】（微細顔料A3）微細顔料A1使用のカチオン樹脂を、ポリジアリルジメチル4級アンモニウム塩酸塩（センカ社製、商品名：CP-103）15部に替えた以外は、微細顔料A1と同様にして調製した。

【0070】（微細顔料A4）市販沈降法シリカ（トクヤマ社製、商品名：ファインシール X-45、平均一次粒子径：約10 nm、平均二次粒子径：約4.5 μm）をサンドグラインダーにより水分散粉砕し、平均二次粒子径が1 μmからなる12%分散液を調製した。分散液にカチオン樹脂（日東紡績社製、商品名：PAS-

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次粒子径が0.3 μmからなる15%分散液を調製した。該分散液にカチオン樹脂（日東紡績社製、商品名：PAS-J-81）10部を添加し、顔料の凝集と分散液の増粘を起こさせた。再度、ナノマイザーを用いて粉砕分散を繰り返し、平均二次粒子径が0.5 μmからなる12%分散液を調製した。

【0072】（微細顔料C）市販フェームドシリカ（トクヤマ社製、商品名：レオロシールQS-30、比表面積300 m²/g、平均一次粒子径：約10 nm）をサンドグラインダーにより水分散粉砕した後、ナノマイザーを用いて粉砕分散を繰り返し、分級後平均二次粒子径が0.08 μmからなる12%分散液を調製した。分散液にカチオン樹脂（日東紡績社製、商品名：PAS-J-81）10部を添加し、顔料の凝集と分散液の増粘を起こさせた。再度、ナノマイザーを用いて粉砕分散を繰り返し、平均二次粒子径が0.15 μmからなる10%分散液を調製した。

【0073】実施例1

支持体A上に、下記の下塗り層①の塗工液を、固形分量で10 g/m²になるように、エアナイフコーターで塗工、乾燥した。次に、下記の下塗り層②の塗工液を、上記の下塗り層①上に固形分量で5 g/m²になるように、エアナイフコーターで塗工し、乾燥した。次に、下記最表面層の塗工液をロールコーターにて塗工し直ちに表面温度が95℃の鏡面ドラムに圧接し、乾燥後、成型させ、光沢タイプのインクジェット記録用紙を得た。このときの最表面層の塗工量は固形分重量で、3 g/m²であった。

【0074】（下塗り層①の塗工液（固形分濃度15%））pH7.5

・合成シリカ（トクヤマ社製、商品名：ファインシール X-60、平均二次粒子径6.0 μm、平均一次粒子径15 nm）70部

・ゼオライト（トーソー製社製、商品名：トヨビルダー、平均二次粒子径1.5 μm）30部

・シリル変性ポリビニルアルコール（クラレ社製、商品名：R1130）20部

【0075】（下塗り層②の塗工液（固形分濃度12%））pH7.0

・微細顔料A 100部

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例1と同様にして光沢タイプのインクジェット記録用紙を得た。(最表面層塗料pH5.5)

【0078】実施例3

最表面層の微細顔料をA3からA1に変えた以外は実施例1と同様にして光沢タイプのインクジェット記録用紙を得た。(最表面層塗料pH6.0)

【0079】実施例4

支持体Aを支持体Bに変更し、最表面層の微細顔料をA3からA2に変えた以外は実施例1と同様にして光沢タイプのインクジェット記録用紙を得た。

【0080】比較例1

支持体Aを支持体Bに変更し、最表面層の微細顔料をA3からA1に変えた以外は実施例1と同様にして光沢タイプのインクジェット記録用紙を得た。

【0081】比較例2

支持体Aを支持体Bに変更し、最表面層の微細顔料をA3からAに変えた以外は実施例1と同様にして光沢タイプのインクジェット記録用紙を得た。(最表面層塗料pH7.5)

【0082】実施例5

支持体A上に、実施例1の下塗り層①用塗工液を、乾燥重量で12g/m²になるように、エアナイフコーターで塗工、乾燥した。次に、下記最表面層用塗工液を上記の下塗り層上にエアナイフコーターで塗工し、冷風で20秒乾燥し半乾燥状態にした後(塗工層乾燥量に対する水分率150%)、表面温度が100℃の鏡面ドラムに圧接し、乾燥後、離型させ、光沢タイプのインクジェット記録用紙を得た。このときの最表面層の塗工量は固形分重量で、6g/m²であった。

【0083】(最表面層用塗工液(固形分濃度12%)) pH5.0

・微細顔料A2 100部

・ポリビニルアルコール(クラレ社製、商品名:PVA117)15部

・ステアリン酸アミド 2部

【0084】実施例6

支持体Aを支持体Bに変更し、最表面層の微細顔料をA2からA1に変えた以外は実施例5と同様にして光沢タイプのインクジェット記録用紙を得た。(最表面層塗料pH5.7)

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【0087】実施例8

支持体C上に、下記の下塗り層用塗工液をダイコーターにて乾燥重量で20g/m²になるように、塗工し乾燥した。次に、下記最表面層用塗工液を上記の下塗り層上にダイコーターにて乾燥重量で6g/m²になるように、塗工し乾燥し、光沢タイプのインクジェット記録用紙を得た。

【0088】(下塗り層用塗工液(固形分濃度12%)) pH8.0

10 ・微細顔料B 100部

・ポリビニルアルコール(クラレ社製、商品名:PVA135)17部

【0089】(最表面層用塗工液(固形分濃度10%)) pH4.5

・微細顔料C 100部

・ポリビニルアルコール(クラレ社製、商品名:PVA135)15部

【0090】実施例9

20 最表面層の微細顔料をCからA2に変えた以外は実施例8と同様にして光沢タイプのインクジェット記録用紙を得た。(最表面層塗料pH5.7)

【0091】比較例4

支持体C上に、下記塗工液をダイコーターにて乾燥重量で20g/m²になるように、塗工し乾燥し、光沢タイプのインクジェット記録用紙を得た

【0092】(塗工液(固形分濃度10%)) pH7.0

・微細顔料A 100部

30 ・ポリビニルアルコール(クラレ社製、商品名:PVA135)15部

【0093】実施例10

微細顔料をAからA4に変えた以外は比較例4と同様にしてインクジェット記録用紙を得た。(最表面層塗料pH5.8)

【0094】実施例11成形面として利用するPETフィルム(京レ社製、商品名:ルミラーT50μm)に、下記塗工液①を塗工量が5g/m²となるようにダイコーターにて塗工・乾燥し、さらにこの層上に、下記塗工液②を、塗工量が10g/m²となるようにダイコーターにて塗工・乾燥した。次に、支持体Bトに下記塗工液

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【0097】実施例12下記塗工液④を、支持体A上に、乾燥重畳で 10 g/m^2 になるように、エアークリーフコーターで塗工、乾燥した。

【0098】（塗工液④（固形分濃度18%））pH 5.5・合成シリカ（トクヤマ社製、商品名：ファインシールX-60、平均二次粒子径 $6.0\text{ }\mu\text{m}$ 、平均一次粒子径 15 nm ）100部・シリル変性ポリビニルアルコール（クラレ社製、商品名：R1130）20部・カチオン樹脂（センカ社製、商品名：CP103）15部・カチオン樹脂（日苺化学社製、商品名：ネオフィックスE117）5部次に、下記塗工液⑤を上記の塗工層上にロールコーターを用いて塗工した後、ただちに表面温度が $85\text{ }^{\circ}\text{C}$ の鏡面ドラムに圧接し、乾燥後、離型させ、光沢タイプのインクジェット記録用紙を得た。このときの光沢層の塗工量は固形分重畳で、 8 g/m^2 であった。

【0099】（塗工液⑤（固形分濃度25%））pH 7.5
・ガラス転移点 $75\text{ }^{\circ}\text{C}$ のステレン-2メチルヘキシルアクリレート共重合体エマルジョン（平均粒子径 40 nm ）30部
・コロイダルシリカ（平均二次粒子径 30 nm ）70部
・増粘・分散剤（アルキルビニルエーテル・マレイン酸誘導体共重合体）5部
・離型剤（レンチン）1.5部
・酢酸0.5部

【0100】比較例5
下記塗工液⑥を、支持体B上に、乾燥重畳で 10 g/m^2 になるように、エアークリーフコーターで塗工、乾燥した。

【0101】（塗工液⑥（固形分濃度18%））pH 6.0
・合成シリカ（トクヤマ社製、商品名：ファインシールX-60、平均二次粒子径 $6.0\text{ }\mu\text{m}$ 、平均一次粒子径 15 nm ）100部
・シリル変性ポリビニルアルコール（クラレ社製、商品名：R1130）20部
・カチオン樹脂（日京紡績社製、商品名：PAS-J-81）5部

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クリレート共重合体 30部
・コロイダルシリカ（平均二次粒子径 30 nm ）70部
・増粘・分散剤（アルキルビニルエーテル・マレイン酸誘導体共重合体）5部
・離型剤（レンチン）1.5部

【0104】実施例13
支持体C上に、下記の塗工液をダイコーターにて乾燥重畳で 15 g/m^2 になるように、塗工し乾燥、光沢タイプのインクジェット記録用紙を得た。

【0105】（最表面層用塗工液（固形分濃度10%））pH 4.5
・微細顔料C 100部
・ポリビニルアルコール（クラレ社製、商品名：PVA135）15部

【0106】実施例14
支持体C上に、下記の塗工液をダイコーターにて乾燥重畳で 20 g/m^2 になるように、塗工し乾燥、光沢タイプのインクジェット記録用紙を得た。

【0107】（最表面層用塗工液（固形分濃度10%））pH 5.7
・微細顔料A2 100部
・ポリビニルアルコール（クラレ社製、商品名：PVA135）15部

【0108】比較例6
支持体A上に、下記塗工液を、固形分量で 5 g/m^2 になるように、エアークリーフコーターで塗工、乾燥し、インクジェット記録用紙を得た。

【0109】（塗工液（固形分濃度15%））pH 5.5
・合成シリカ（トクヤマ社製、商品名：ファインシールX-45、平均二次粒子径 $4.5\text{ }\mu\text{m}$ 、平均一次粒子径 15 nm ）100部
・シリル変性ポリビニルアルコール（クラレ社製、商品名：R1130）20部・カチオン樹脂（センカ社製、商品名：CP103）15部

【0110】比較例7
支持体B上に、下記塗工液を、固形分量で 5 g/m^2 になるように、エアークリーフコーターで塗工、乾燥し、インクジェット記録用紙を得た。

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81) 5部

・アンモニオ。5部

【0112】参考例1

支持体Aをそのまま用いた。

【0113】この様にして得られたインクジェット記録用紙の品質を表1に示した。なお、上記の評価については下記の如き方法で評価を行った。

【0114】【インク受容層の最表面層の表面pH】J APAN TAPPI No. 6「紙及び板紙の表面pH試験方法」における「2. 1 検布法」に準拠して測定した。ただし、インク受容層に浸透することを前提として、pH測定用指示薬溶液（共立理化学研究所製）を表面に塗布後、1～2分後に判定のところを5～10秒後にpH標準変色表により判定し、表面pHとした。

【0115】【白紙黄変】白紙サンプルを、市販のプラスチック（ポリプロピレン製）透明ファイルに挿入し、60℃で7日間放置した。処理前後の記録層面の色差（L*、a*、b*）を測定し、処理前後のb*の差=Δb*を算出した。

◎：Δb*が0.4以下であり、黄変は判らない。

○：Δb*が0.5～0.9であり、黄変はほとんど判らないレベル。

△：Δb*が1.0～1.6であり、黄変が実用上気になるレベル。

×：Δb*が1.7以上であり、黄変がかなり気になるレベル。

【0116】【白紙光沢度】JIS-P8142に準じて白紙部の75°光沢を測定した。

【0117】【インクジェット記録適性】インクジェットプリンターPM770C（セイコーエプソン社製）を用いて印字を行なった。

【0118】（ベタ印字部の均一性）シアンインクとマ*

*ゼンタインクの2色混合のベタ印字部の印字ムラ（濃淡ムラ）を目視にて評価した。

○：印字ムラは見られず良好なレベル。

○-：印字ムラが若干あるが、実用上問題とならないレベル

△：印字ムラがややあり、実用上やや問題となるレベル。

×：印字ムラが目立ち、実用上問題となるレベル。

【0119】（印字ニジミ）ブラック、シアン、マゼンタ、イエローの各色インクのベタ印字部を、境界部が互いに接する様に印字し、境界でのニジミを目視にて評価した。

○：ニジミは見られず良好なレベル。

○-：ニジミが若干あるが、実用上問題とならないレベル

△：ニジミがやや目立ち、実用上やや問題となるレベル。

×：ニジミが目立ち、実用上問題となるレベル。

【0120】（インクジェット記録後の印字濃度）黒ベタ印字部分の印字濃度をマクベスRD-914で測定。

【0121】（印字耐水性）ブラック、シアン、マゼンタ、イエローの各色インクのベタ印字部と白紙部の境界に、水を数滴スポイドでたらし、自然乾燥したのち、インクの滲みを目視にて評価した。

◎：ニジミは見られず良好なレベル。

○：ニジミが若干あるが、実用上問題とならないレベル

○-：ニジミがやや目立ち、実用上やや問題となるレベル。

×：ニジミが目立ち、実用上問題となるレベル。

【0122】

【表1】

	支持体	表面pH	白紙黄変	白紙光沢度	印字品位			
					均一性	ニジミ	耐水性	印字耐水性
実施例1	A	8.9	◎	78	○	○	2.20	◎
実施例2	A	5.0	◎	78	○	○	2.25	○
実施例3	A	0.1	○	78	○	○	2.20	○-
実施例4	B	6.4	○	78	○	○	2.25	○
比較例1	B	7.9	×	78	○	○	2.20	○-
比較例2	B	7.7	○	60	○	○-	1.75	×
実施例5	A	4.5	◎	60	○	○	2.15	◎
実施例6	B	7.3	△	68	○	○	2.10	○-
比較例3	B	7.6	○	88	○	○-	1.75	×
比較例4	B	8.8	△	88	○	○	1.80	△

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により得られたインクジェット記録用紙は、印字濃度、
記録画質等のインクジェット記録適性に優れ、特に保存

性（耐白紙黄変性）に優れたものである。

PATENT ABSTRACTS OF JAPAN

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(54) INK JET RECORDING SHEET

(57)Abstract:

PROBLEM TO BE SOLVED: To provide an ink jet recording excellent in the fitness of ink jet recording such as a printing density, recording picture quality or the like and, at the same time, especially excellent in presevability (or resistance to the yellowing of a white paper).

SOLUTION: In this ink jet recording paper, at least one layer or more of ink accepting layers are provided onto a base material. The top layer of the sheet is made mainly of amorphous silica having the average secondary particle diameter of 0.01 to 1 μm as a pigment and an adhesive. At least one layer of the ink accepting layers includes a cationic compound. The surface pH of the top layer is set to be 3.0 to 7.5. Preferably, the average printing particle diameter of the amorphous silica is set to be 3 to 40 nm, more preferably the 75° surface glossiness is 30% or higher.

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CLAIMS

[Claim(s)]

[Claim 1] The ink jet record form which said ink absorbing layer contains a cationic compound for amorphous silica with a particle diameter [second / an average of] of 0.01-1 micrometer and adhesives further with a principal component as a pigment, and is characterized by the front faces pH of said ink absorbing layer being 3.0-7.5 in a base material and its ink jet record form which prepared the ink absorbing layer on the whole surface at least.

[Claim 2] The ink jet record form which the maximum surface layer of said ink absorbing layer uses amorphous silica with a particle diameter [second / an average of] of 0.01-1 micrometer and adhesives as a principal component as a pigment , and contains a cationic compound in the ink jet record form which was able to prepare a base material and two or more of its ink absorbing layers on the whole surface at least in any one layer of further two or more ink absorbing layers , and is characterize by the front faces pH of said maximum surface layer be 3.0-7.5 .

[Claim 3] The ink jet record form according to claim 1 or 2 characterized by the first [an average of] particle diameter of said amorphous silica being 3-40nm.

[Claim 4] The ink jet record form according to claim 1 to 3 characterized by 75-degree surface glossiness (JIS-P8142) being 30% or more.

[Claim 5] The ink jet record form according to claim 4 characterized by being the layer in which said maximum surface layer comes to imprint a smooth side.

[Claim 6] The ink jet record form according to claim 4 or 5 characterized by 75-degree surface glossiness (JIS-P8142) being 50% or more.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] About an ink jet record form, especially this invention is excellent in ink jet record fitness, and relates to the ink jet record form with which yellowing of a blank paper was controlled further. Moreover, it is related with the ink jet record form excellent also in gloss.

[0002]

[Description of the Prior Art] The ink jet recording method in which spout water color ink on a record object from a detailed nozzle, and an image is made to form is widely used by the printer for terminals, facsimile, the plotter, or document printing from reasons that there is little noise at the time of record, and colorization is easy, possible [high-speed record], cheaper than other airline printers. On the other hand, a property advanced

also to a record object side came to be requested from rapid spread, and rapid high definition and improvement in the speed of a printer, and a pan by the appearance of a digital camera. That is, the implementation of the record object which combines the image quality which is equal to the photograph of a silver salt method, and shelf life excellent in absorptivity, record concentration, a water resisting property, and shelf life is called for strongly. Glossiness is also demanded in order to make it a photograph tone further more. The method of graduating a coating layer front face by ****(ing) between the rolls to which a pressure and temperature were applied, using equipments, such as a supercalender, as an approach of generally giving glossiness is learned. However, by such approach, since the openings of a coating layer decrease in number to a top inadequate as glossiness, the phenomenon of a printing blot will arise as a result. Moreover, although many methods of preparing the ink absorbing layer by ink absorptivity resin, such as starch, gelatin, a water-soluble cellulosic, polyvinyl alcohol, and a polyvinyl pyrrolidone, on the plastic film which have glossiness and smooth nature, or resin coat paper be proposed, it be easy to generate ink absorption nonuniformity, and such a record object had the problem that where of a water resisting property and curl be also inferior in the top where handling nature be bad, since absorption and desiccation of ink be slow, although glossiness be acquired.

[0003] As a means which can solve these problems, the paint film which used the ultrafine particle pigment as the principal component is proposed (JP,2-274857,A, JP,8-67064,A, JP,8-118790,A, JP,9-286162,A, JP,10-217601,A). Among these, although the glossiness of a certain extent and a water resisting property were obtained, since it was a primary particle, as for colloidal silica, sufficient opening was not formed, and the approach (JP,2-274857,A, JP,8-67064,A, JP,8-118790,A) using colloidal silica with small particle diameter was not that ink absorptivity is also still satisfying. The so-called cast coated paper obtained by copying the mirror plane is known by sticking by pressure and drying a humid coating layer as a high form of surface gloss to the heating drum side which has a mirror plane. Since it has the surface smooth nature which was superior to high surface gloss as compared with the usual coated paper by which super calender finishing was carried out and the outstanding printing effectiveness is acquired, this cast coated paper is chiefly used for the application of a high-class print etc., but various difficulties are held when it uses for an ink jet record form. That is, generally, conventional cast coated paper has acquired high gloss, when membrane formation nature matter, such as adhesives in the pigment constituent which constitutes the coating layer, copies the mirror plane drum front face of a cast coating machine. On the other hand, the porosity of a coating layer is lost by existence of this membrane formation nature matter, and it has the problem of reducing extremely absorption of the ink at the time of ink jet record. And although it is important to make it porous so that a cast coating layer can absorb ink easily and it is necessary to reduce membrane formation nature for that purpose in order to improve this ink absorptivity, blank paper gloss falls as a result by reducing the amount of the membrane formation nature matter. Like the above, it was very difficult to satisfy simultaneously both the surface gloss of cast coated paper, and ink jet record fitness.

[0004] On the stencil which prepared the recording layer which uses a pigment and adhesives as a principal component as an approach of solving the above-mentioned problem To the mirror plane drum heated while carrying out coating of the coating liquid

which uses as a principal component the copolymer constituent which has a glass transition point 40 degrees C or more, making the coating layer for the casts form and this coating layer for the casts being in a damp or wet condition, dry and a pressure welding and by finishing It is shown in JP,7-89220,A that the cast paper for ink jet record which combines the outstanding gloss and ink absorptivity is obtained. However, although record quality and shelf life which quality of high definition, high record concentration, and high shelf life is further desired in recent years with amplification of applications, such as improvement in the speed of ink jet record, highly-minute-izing of a record image, and full-color-izing, for example, are equal to the photographic paper for photographs of a silver salt method are searched for, in order to fill such a demand, even if it uses the technique proposed previously, the actual condition is that achievement is difficult. The problem of the blank paper section passing and yellowing according to the time or storage conditions also in the case of the ink jet record form which is excellent in gloss and ink jet record fitness which were especially described above is not solved. Although the approach (JP,1-258980,A) using the pigment cation--ization-processed as amelioration of the indoor shelf life of an image is proposed, the shelf life of the blank paper section is not solved. The approach (JP,11-342668,A) using the amorphous silica which has pore volume in the specific range about the shelf life of the blank paper section is difficult for application in the ink jet record form excellent in gloss, although yellowing improves as shelf life.

[0005]

[Problem(s) to be Solved by the Invention] This invention offers the ink jet record form excellent in especially shelf life (blank paper-proof xanthochroism) about the ink jet record form excellent in ink jet record fitness, such as printing concentration and record image quality. Furthermore, the ink jet record form excellent in glossiness is offered.

[0006]

[Means for Solving the Problem] This invention adopts the following configuration in order to solve the above-mentioned technical problem. That is, this invention is an ink jet record form which said ink absorbing layer contains a cationic compound for amorphous silica with a particle diameter [second / an average of] of 0.01-1 micrometer and adhesives further with a principal component as a pigment, and is characterized by the front faces pH of said ink absorbing layer being 3.0-7.5 in [1] base material and its ink jet record form which prepared the ink absorbing layer on the whole surface at least. [2] The ink jet record form which the maximum surface layer of said ink absorbing layer use amorphous silica with a particle diameter [second / an average of] of 0.01-1 micrometer and adhesives as a principal component as a pigment , and contain a cationic compound in the ink jet record form which be able to prepare a base material and two or more of its ink absorbing layers on the whole surface at least in any one layer of further two or more ink absorbing layers , and be characterize by the front faces pH of said maximum surface layer be 3.0-7.5 .

[0007] This invention contains each following mode.

[3] [1] characterized by the first [an average of] particle diameter of said amorphous silica being 3-40nm, or an ink jet record form given in [2].

[4] An ink jet record form given in either of [1] - [3] characterized by 75" surface glossiness (JIS-P8142) being 30% or more.

[5] An ink jet record form given in [4] characterized by being the layer in which said

maximum surface layer comes to imprint a smooth side.

[6] [4] characterized by 75" surface glossiness (JIS-P8142) being 50% or more, or an ink jet record form given in [5].

[0008]

[Embodiment of the Invention] Although various factors could be considered in yellowing of a blank paper and gas, such as light, heat, humidity, ozone, and NOX, etc. could be considered for discoloration in a long period of time, even if it kept it in the indoor cool place, remarkable yellowing might occur for a short period of time.

Remarkable yellowing was seen when were especially kept in plastics files, such as a clear electrode holder and a business-card electrode holder, and adhesive tape was stuck on a form front face or a rear face, and it was left on a rubber plate. That which is yellowed is presumed, as a result of plastics and rubber being adsorbed by pigments, such as a silica in the recording layer of an ink jet record form, as a cause of these yellowing in the anti-oxidant by which minute amount content is carried out and oxidizing by oxygen etc. Moreover, what existence of a cationic compound has also influenced is presumed.

[0009] When a cationic compound (cation resin) was blended as a result of examination, such as this invention person, it became clear that it is in the inclination which yellowing tends to generate. On the other hand, in order to raise printing grace, such as grant of high printing concentration and a printing water resisting property, combination of a cationic compound is indispensable. Furthermore, the above-mentioned phenomenon is the object which gives high record concentration, or the object which gives surface gloss, and, in the case of the ink jet record form which used the detailed pigment for the recording layer, the remarkable thing became clear especially. It is presumed to be the causes that the detailed pigment (fine porosity) which has specific mean particle diameter with ink absorptivity good [this reason] has the high capacity to adsorb an antioxidant etc., and that the transparency of an acceptance layer is high and yellowing tends to be conspicuous. namely, the case where only such a detailed pigment is used although it was desirable to have used the detailed pigment whose second [an average of] particle diameter which lower-** is the second [an average of] particle diameter of 0.01-1 micrometer of a detailed pigment 1 micrometer or less and the aggregated particle which the primary particle especially condensed, especially the detailed pigment whose first [an average of] particle diameter is 4-30nm in order to acquire a high ink jet recording characteristic and gloss -- a blank paper -- the inclination to be easier to occur has yellowing.

[0010] by the way -- even if it blends a cationic compound -- a blank paper -- as a result of inquiring per [which yellowing cannot generate easily] a formula and configuration, it became clear by setting the front face pH of the maximum surface layer to 3.0-7.5 that a remarkable improvement effect was accepted. If pH7.5 is exceeded, an anti-oxidant, for example, a phenolic compound etc., will be presumed because it oxidizes and is easy to be colored under existence of a cationic compound. The front face pH of the maximum surface layer has the inclination to be influenced by the base material front face pH, and tends to control pH of the front face of the maximum surface layer or less to 7.5 comparatively easily as the front face pH of a base material is 6.0 or less. For that, coating and sinking in are mentioned in the ingredient which is made to contain the acid in a base material, or contains the acid on a base material front face. The so-called acid paper milled from the pulp slurry containing a sulfuric-acid band as a paper stencil which

satisfies such requirements is suitable. Generally the front face pH of acid paper is 2.0 to about 6.0. Moreover, a front face pH may be adjusted to 6.0 or less by the so-called alkaline paper which does not contain a sulfuric-acid band applying the acid to a front face etc. The coated paper for general printing which prepared the coating layer containing a pigment on the paper stencil as a base material can also be used, and a front face pH can use what was adjusted to 5.0 or less also in this case. Generally the front face pH of the coated paper using an acid stencil is 3.0 to about 6.0. It becomes [it is required coating and to sink in the ingredient which contains the strong acid nature matter on a base material front face, and / the shelf life of the ink jet record form itself] low using an acid stencil low to the degree of pole of a front face pH, and is not desirable in order for the front face pH of the maximum surface layer to carry out to less than 3.0.

[0011] Moreover, when the so-called RC paper which covered polyolefin resin is used for a paper front face as a base material, in order that there may be no osmosis of the ink to a base material, the BOKOTSUKI phenomenon of the record form by ink absorption and the phenomenon which carries out common-name cock ring ** do not occur, but it is easy to discover surface gloss. Moreover, aesthetic property equivalent to the photographic printing paper is obtained. RC paper used for the photographic printing paper of a silver salt method is the object which raises the adhesive property of a surface coating agent, and is carrying out coating of the gelatin etc. The front face pH of such RC paper is 6.0 to about 7.0. When using a plastic film etc. for a base material, a front face pH is neutrality in many cases, in this case, can carry out coating of the acid to a front face, and can adjust a front face pH. A base material is further stated to a detail below.

[0012] Any of an absorptivity base material and an unabsorbent base material are sufficient as the base material used in [base material] this invention. Since the base material itself has ink absorptivity when an absorptivity base material is used, it is not necessary to make [many] the amount of coating of an ink absorbing layer. Moreover, since permeability is in a base material when forming the maximum surface layer with imprint methods, such as the cast method, so that it may mention later, manufacture becomes easy. When an unabsorbent base material is used, since a thing without the cock ring of a record object is obtained, it is desirable. Moreover, from a viewpoint of raising surface smooth nature and surface glossiness, plastic films and resin coat paper like a photographic-printing-paper form (RC paper) are desirable. When plastic films and RC paper are used, even if not based on an imprint method, it is easy to discover surface gloss. Moreover, when RC paper is used, aesthetic property equivalent to the photographic printing paper is obtained.

[0013] (Absorptivity base material) As an absorptivity base material, paper of fine quality (acid paper, alkaline paper), art paper, coat paper, cast coated paper, kraft paper, an impregnated paper, etc. can be illustrated, for example. When it desires film-photo[high smooth nature and]-like aesthetic property (especially a whiteness degree, a feel) etc., the paper base of high smoothness, such as a stencil for RC papers, and high bulk density (consistency) is desirable. It explains to a detail per paper base. A paper base is constituted considering a pigment as a principal component wood pulp and if needed. Various chemical pulp, mechanical pulp, playback pulp, etc. can be used for wood pulp, and these pulp can adjust a degree of beating by beater, in order to adjust paper durability, paper-making fitness, etc. Although especially the degree of beating (freeness) of pulp does not limit, generally it is 250-550ml (Canada standard freeness: call JISP-

8121 and Following CSF) extent. A pigment gives opacity etc., or it blends it in order to adjust ink absorptivity, and it can use a calcium carbonate, a baking kaolin, a silica, titanium oxide, etc. In this case, about 1 - 20% of loadings are desirable. When many [too], there is a possibility that paper durability may decline. A sizing compound, a fixing agent, a paper reinforcing agent, a cation-ized agent, a yield improver, a color, a fluorescent brightener, etc. can be added as an assistant. Furthermore, in the size press process of a paper machine, starch, polyvinyl alcohol, cation resin, etc. are carried out spreading and impregnation, and whenever [surface reinforcement and size] etc. can be adjusted. Whenever [size] has about 1 - 200 desirable seconds. It may become operation top problems -- if whenever [size] is lower than 1 second, a wrinkle will occur at the time of coating -- and if whenever [size] is higher than 200 seconds, ink absorptivity may fall, or the curl after printing and a cock ring may become remarkable. Although especially the basis weight of a paper base is not limited, its about two 20 - 400 g/m is desirable. Moreover, about three 0.6 - 1.2 g/cm of thickness of paper is [about 20-400 micrometers and bulk density] desirable.

[0014] Neither of the base materials is chosen. (Non-absorptivity base material) as a non-absorptivity base material -- transparence -- opaque -- Cellophane, polyethylene, polypropylene, plasticized polyvinyl chloride, polyester, Plastic films, such as a polycarbonate and polystyrene, or absorptivity, The plastic films of said publication chosen from any of non-absorptivity The resin coat object which covered with non-absorptivity resin the base materials (for example, paper of fine quality, alkaline paper, a photographic paper stencil, art paper, coat paper, cast coated paper, kraft paper, an impregnated paper, etc.) which use a resin film, a synthetic paper, and pulp as a principal component is used suitably. As resin for a coat, what uses those mixture, such as polyethylene system resin, a polypropylene resin, polyester system resin, polyolefine system resin, and polycarbonate system resin, as a principal component can be used. As polyethylene system resin, there are low-density-polyethylene resin, high-density-polyethylene resin, straight chain-like low-density-polyethylene resin, etc. As polyester system resin, there are polyethylene terephthalate resin, polybutyrene terephthalate resin, polyester system biodegradability resin, etc.

[0015] plastic films and a resin coat object (the base material or resin for a coat covered) -- the object of a whiteness degree rise and a concealment nature rise -- it is -- white pigments -- it is possible to also make a titanium oxide pigment, a calcium carbonate, a synthetic silica, or the thing that used these together contain preferably. A titanium oxide pigment is the most desirable. As white pigments, the pigment of well-known official businesses, such as a synthetic silica, a zinc oxide, talc, and a kaolin, can be used. Since film-photo-like aesthetic property (especially a whiteness degree, a feel) is hard to be obtained at an expensive price, plastic films can use the resin coat paper covered so that a principal component may consist of pulp, polyethylene system resin, a polypropylene resin, polyester system resin, polyolefine system resin, polycarbonate system resin, etc. may use those mixture as a principal component at the paper of fine quality which has the Takahira slippage, a photographic paper stencil, art paper, coat paper, and cast coated paper and it might have the Takahira slippage.

[0016] Especially the resin coat paper (RC paper) covered so that it might have the Takahira slippage by polyolefine system resin, such as polyethylene system resin, in a photographic paper stencil especially is desirable. A resin coat extrudes and carries out

coating of the polyolefine system resin which carried out thermofusion from a die head, and is performed by cooling and solidifying with a cooling roll promptly. The resin enveloping layer of the side which prepares an ink absorbing layer is good to use the cooling roll which has a smooth side according to a mirror plane or it in order to obtain high smooth nature. Moreover, in order to obtain the aesthetic property (especially feeling of a feel) of a photographic-printing-paper tone, it is desirable to also cover a recording surface and the field (rear face) of an opposite hand with polyethylene system resin or other polyolefine system resin from the reason for controlling curl of a record object etc. In order to give the aesthetic property of photographic paper, and in order that a resin enveloping layer on the back may give printer conveyance nature, it is desirable to make it a mat side and it is good to use the cooling roll which has a mat side.

[0017] Although especially the thickness of a resin enveloping layer is not limited, it is desirable to consider as the range of 4-100 micrometers. 5-50 micrometers is 7-35 micrometers more preferably. If too few, the effectiveness of a coat runs short, and aesthetic property is inferior when many [too]. It is also possible to adjust the resin thickness of covering of a recording surface and a rear face, or to choose the resin for a coat in consideration of curl of a record object. the resin for a coat -- white pigments -- it is possible to also make a titanium oxide pigment, a calcium carbonate, a synthetic silica, or the thing that used these together contain preferably. A titanium oxide pigment is the most desirable.

[0018] When an unabsorbent base material is used for a base material, it is also possible to perform adhesion processing and adhesion processing to a recording surface side beforehand for the object of giving or raising the adhesion of a base material and a recording layer. When especially resin coat paper is used, it is desirable to prepare the under coat layer by to perform corona discharge treatment, gelatin, polyvinyl alcohol, etc. It is also possible to process for the object, such as conveyance nature, electrification prevention, and blocking prevention, at the base material rear face. Rear-face processing can add other configurations suitably, such as preparing chemical preparation or a coat layer.

[0019] although especially smoothness is not limited -- high gloss and high -- in order to acquire a smooth field, it is desirable that it is more than 300 second (Oken type, J.TAPPI No.5). Furthermore, although especially opacity is not limited, either, in order to obtain photographic-printing-paper-like aesthetic property (especially feeling whiteness degree of **), it is 93% or more more preferably 85% or more of opacity (JIS P8138).

[0020] [Ink absorbing layer] An ink absorbing layer is described below. An ink absorbing layer uses a pigment, adhesives, and a cationic compound as a principal component. Although what is necessary is just to contain a cationic compound in one of layers [them] at least when preparing one or more layers of ink absorbing layers, if it can do, it is desirable [a compound] the upper layer and to blend with the maximum surface layer as much as possible, in order to make printing concentration high.

[0021] (Detailed pigment) Since it excels in the absorptivity and the fixable one of ink when the amorphous silica whose first [an average of] particle diameter is 3-40nm and whose second [an average of] particle diameter is 0.01-1 micrometer is used for the maximum surface layer of the ink absorbing layer of this invention as a detailed pigment whose second [an average of] particle diameter is 0.01-1 micrometer, in order to obtain high printing concentration and high gloss, it is desirable.

[0022] In addition, fumed silica is mentioned as amorphous silica especially with high transparency. Fumed silica can make comparatively high purity of the silicon tetrachloride used as a raw material by distillation, and since the production process of a closed system is still more possible, it is possible to prevent mixing of an impurity also in a production process. If fumed silica with such high purity is contained, it is possible to obtain high printing concentration and high gloss.

[0023] Moreover, as a detailed pigment which can be used together with amorphous silica, although a very fine particle like colloidal silica and a colloidal alumina is mentioned for example, a primary particle and the second [an average of] particle diameter which the primary particle with a particle diameter [first / an average of] of 3-40nm condensed preferably can grind and distribute an aggregated particle 1 micrometers or more, and can obtain the above-mentioned detailed pigment. Specifically, the various pigments of well-known official business are mentioned as such an aggregated particle in the common coated paper manufacture fields, such as an alumina (aluminum oxide), a kaolin, clay, baking clay, a zinc oxide, the tin oxide, magnesium sulfate, an aluminum hydroxide, pseudo-boehmite, a calcium carbonate, a satin white, an aluminum silicate, a smectite, a zeolite, a magnesium silicate, a magnesium carbonate, magnesium oxide, diatomaceous earth, a styrene system plastics pigment, a urea-resin system plastics pigment, and a benzoguanamine system plastics pigment. These can be used together one sort or more than it.

[0024] These aggregated particles until the second [an average of] particle diameter is set to 1 micrometer or less Grinding, when distributed processing is carried out, The aggregated particle of second [an average of] particle diameter the order of several micrometers for example, to media, such as water The ultrasonic homogenizer after making it distribute so that solid content concentration may generally become about 5 - 20%, It can obtain using a pressure type homogenizer, a high-speed tumbling mill, a roller mill, a container actuation medium mill, a medium agitation mill, a jet mill, etc. by making small the second [an average of] particle diameter by the mechanical means. Thus, generally the processed detailed pigment is obtained as the slurry whose solid content concentration is about 5 - 20%, or a colloidal particle.

[0025] In addition, when the number of ink absorbing layers is one, other pigments may be contained in addition to the detailed pigment specified to the maximum surface layer in the case of being more than two-layer by this invention. for example, an alumina and a kaolin with the second [an average of] larger particle diameter than 1 micrometer, clay, baking clay, a zinc oxide, the tin oxide, magnesium sulfate, an aluminum hydroxide, pseudo-boehmite, a calcium carbonate, a satin white, an aluminum silicate, a smectite, a zeolite, a magnesium silicate, a magnesium carbonate, magnesium oxide, diatomaceous earth, a styrene system plastics pigment, a urea-resin system plastics pigment, a benzoguanamine system plastics pigment, etc. -- generally the various pigments of well-known official business are suitably used in the coated paper field. In this case, in order to obtain high ink absorptivity, high printing concentration, and high gloss, as for those loadings, it is desirable to consider as 20% or less still more preferably 50% or less.

[0026] When the ink absorbing layer of this invention is more than two-layer, in layers other than the maximum surface layer For example, amorphous silica, an alumina with larger mean particle diameter than 1 micrometer, A kaolin, clay, baking clay, a zinc oxide, the tin oxide, magnesium sulfate, An aluminum hydroxide, pseudo-boehmite, a

calcium carbonate, a satin white, An aluminum silicate, a smectite, a zeolite, a magnesium silicate, a magnesium carbonate, magnesium oxide, diatomaceous earth, a styrene system plastics pigment, a urea-resin system plastics pigment, a benzoguanamine system plastics pigment, etc. -- generally the various pigments of well-known official business are suitably used in the coated paper field. Moreover, said pigment may be used, making it detailed.

[0027] The mean particle diameter as used in the field of this invention is particle diameter altogether observed with the electron microscope (SEM or TEM) (what took the 10,000 to 400,000 times as many electron micrograph as this, measured the diameter of Martin of the particle in 5cm around, and was averaged.). It is indicated in 52, P1991 of a "particle handbook" (Asakura Publishing), etc. The second [an average of] particle diameter of the detailed pigment preferably used by this invention is 0.01-1 micrometer or less. More preferably, it is 0.01-0.5 micrometers and is 0.015-0.3 micrometers still more preferably. The second [an average of] particle diameter also with the suitable case of a cationic compound which lower-**, and the compound-ized detailed pigment is the same. When the second [an average of] particle diameter of the secondary particle of a detailed pigment exceeds 1 micrometer, the transparency of an ink absorbing layer falls, the color enhancement of the color to which it was fixed all over the ink absorbing layer falls, and there is an inclination which becomes [high printing concentration] is hard to be obtained.

[0028] Moreover, although it is desirable that it is an aggregated particle as for a detailed pigment, 5nm or more 30nm or less is 7nm or more 20nm or less still more preferably preferably [that the first / an average of / particle diameter of a primary particle is 3nm or more 40nm or less in this case], and more preferably. If this primary particle diameter is set to less than 3nm, the opening between primary particles will become remarkably small, the capacity which absorbs the solvent and ink in ink declines, and the image grace considered as a request becomes is hard to be acquired. Moreover, if primary [an average of] particle diameter exceeds 40nm, the condensed secondary particle becomes large, the transparency of the maximum surface layer of an ink absorbing layer will fall, the color enhancement of the color to which it was fixed into the maximum surface layer of an ink absorbing layer will fall, and the printing concentration considered as a request will become is hard to be obtained. 50% or more of the ratio of the detailed pigment in all the pigments in the maximum surface layer of an ink absorbing layer is desirable in order to maintain transparency. If the ratio of the detailed pigment in [all] a pigment will be less than 50%, lowering of transparency may be remarkable, and image grace, such as printing concentration, may fall.

[0029] (Combination of a cationic compound) It is desirable that a cationic compound is blended with one of layers at least for the object of an ink absorbing layer to which the anionic color component in ink is fixed. In order to obtain high printing concentration, it is desirable to fix an ink color near the front face as much as possible, and it is good for a cationic compound to blend with the layer near the maximum surface layer or the maximum surface layer. Although what is necessary is just to mix the approach of combination to said pigment, especially as for the case of a detailed pigment, condensation may take place in the case of mixing. Moreover, generally amorphous silica is anionic and condensation tends to occur, for example. In this case, after adding a cationic compound to ** pigment, it is desirable to add a cationic compound, and to grind

and distribute grinding and distribution, or ** pigment further, after distributing, a certain extent grinding and. Consequently, that part at least exists with a cationic compound and the compound-sized gestalt. in the case of the detailed pigment, especially the cationic compound was mentioned above -- like, it blends in process of grinding and distribution, and is all -- it is -- although it is desirable to compound-size a part, it is the object which adjusts quality, such as a printing water resisting property, printing concentration, and a printing blot, and a cationic compound can be further blended with a cation-sized processing detailed pigment. In this case, since the processing detailed pigment is cationized, even if it carries out additional combination of the cationic compound further, condensation cannot take place easily.

[0030] (Cationic compound) As a cationic compound, cation resin and low-molecular cationic compounds (for example, cationic surfactant etc.) are mentioned. In respect of the effectiveness of the improvement in printing concentration, cation resin is desirable and can use it as water soluble resin or an emulsion. Furthermore, cation resin is insolubilized with means, such as bridge formation, and it can be used also as a cationic organic pigment made into the particle-like gestalt. In case such a cationic pigment carries out the polymerization of the cation resin, it copolymerizes a polyfunctional monomer, and uses it as bridge formation resin, or adds a cross linking agent if needed to the cation resin which has reactant functional groups (a hydroxyl group, a carboxyl group, the amino group, aceto acetyl group, etc.), and uses it as bridge formation resin with means, such as heat and a radiation. A cationic compound, especially cation resin may play a role of adhesives.

[0031] Cation resin can illustrate the following. Specifically Polyalkylene polyamine or the derivatives of those, such as 1 polyethylene polyamine and polypropylene polyamine, 2) Acrylic resin which has a secondary amine radical, a tertiary amine radical, and the 4th class ammonium, 3) A polyvinyl amine, polyvinyl amidines, cyanogen system cation resin represented by 4 dicyandiamide-formaldehyde polycondensation, 5) Polyamine system cation resin represented by the dicyandiamide-diethylenetriamine polycondensation object, 6) An epichlorohydrin-dimethylamine addition polymerization object, 7 dimethyl diaryl ammoniumchloride copolymerization object, 8) A diaryl amine salt copolymerization object, 9 dimethyl diaryl ammoniumchloride polymerization object, 10) Cationic compounds, such as a polymerization object of an allylamine salt, the 4th class salt polymerization object of 11 dialkyl aminoethyl (meta) acrylate, and a 12 acrylamide-diaryl amine salt copolymerization object, are raised. As a low-molecular cationic compound, it is the low molecular weight compound which has the 1st class amino group, the 2nd class amino group, the 3rd class amino group, and a quarternary-ammonium-salt radical, and a thing with a molecular weight of 1000 or less about is raised. all the pigment 100 weight sections of the layer with which a cationic compound, i.e., cation resin and a low-molecular cationic compound, blends a cationic compound -- receiving -- the 1 - 100 weight section -- it can be more preferably used in the range of 5 - 50 weight section. If there are few loadings, the effectiveness of improvement, such as a printing water resisting property and printing concentration, will be hard to be acquired, and if many, printing concentration may fall to reverse, or NIJIMI of an image may occur.

[0032] (Adhesives) as adhesives -- water soluble resin (for example, polyvinyl alcohol --) A polyvinyl pyrrolidone, casein, soybean protein, synthetic protein, starch, Cellulosics,

such as carboxyl methyl cellulose and methyl cellulose, Conjugated diene system polymer latexes, such as a styrene-butadiene copolymer and a methyl methacrylate-butadiene copolymer, In addition to this, generally, it can blend in the range which does not check the effectiveness of this invention for the various adhesives of well-known official business in the coated paper field, such as water-dispersion resin, such as vinyl system copolymer latexes, such as a styrene-vinyl acetate copolymer, aqueous acrylic resin, aqueous polyester resin, and aqueous polyurethane resin. the loadings of adhesives -- all the pigment 100 weight sections -- receiving -- the 1 - 200 weight section -- it is more preferably adjusted in the range of the 10 - 100 weight section. If there are few amounts of adhesives here, that desired effectiveness is hard to be acquired, the reinforcement of a coating layer becomes weak further, and a front face tends to get damaged, it may become or powder omission may occur. Conversely, if many, ink absorptivity falls and desired ink jet record fitness may not no longer be acquired.

[0033] (Release agent etc.) When forming the maximum surface layer by the imprint method so that it may lower-**, the release agent used in the case of the usual coated paper for printing or the cast paper manufacture for printing can be blended. As such a release agent, silicone compounds, such as higher-fatty-acid alkali salt, such as polyolefine waxes, such as higher-fatty-acid amides, such as octadecanamide, polyethylene wax, and a polypropylene wax, calcium stearate, zinc stearate, an oleic acid potassium, and oleic acid AMMOMIUMU, lecithin, silicone oil, and silicone wax, are mentioned. the loadings of a release agent -- all the pigment 100 weight sections -- receiving -- 0.1 - 50 weight section -- desirable -- 0.5 - 30 weight section -- it is more preferably adjusted in the range of 1 - 20 weight section. If there are few loadings here, the effectiveness of a mold-release characteristic improvement will be hard to be acquired, and if many, gloss may fall to reverse, or HAJIKI of ink and lowering of record concentration may arise.

[0034] In order to adjust a whiteness degree, viscosity, a fluidity, etc. in an ink absorbing layer coating constituent, various assistants, such as the pigment currently used for the general coated paper for printing and general inkjet printing paper, a defoaming agent, a coloring agent, a fluorescent brightener, an antistatic agent, antiseptics and a dispersant, and a thickener, are added suitably.

[0035] (Space pH adjustment of the maximum surface layer of an ink absorbing layer) In this invention, pH of the front face of the maximum surface layer of an ink absorbing layer needs to be 3.0-7.5. In order to change into such a condition, it is attained by adjusting pH of a coating constituent. In this case, as pH of the maximum surface-layer coating constituent, 4.0 to about 7.0 are [3.0 to about 8.0] preferably suitable. However, pH of the maximum surface-layer front face is influenced by the front face pH of undercoat, and pH of an undercoat coating constituent when pH not only on pH of the coating constituent for the maximum surface layers of an ink absorbing layer but the front face of a base material and undercoat are prepared. In addition, a coating constituent may condense [pH of said maximum surface-layer coating constituent] less than by 3.0, gloss may not be demonstrated or printing grace may fall. Moreover, since pH of undercoat must be made low, a coating constituent may condense [pH of the coating constituent of undercoat] less than by 3.0 in that case, gloss may not be demonstrated or printing grace may fall when pH of said maximum surface-layer coating constituent exceeds 8.0, the desired front face pH may not be obtained.

[0036] Choosing a pigment is mentioned in order to make pH of a coating constituent about into 3.0 to 8.0. For example, pigments, such as an alumina, show acidity, i.e., a with a pH of 7.0 or less value. Moreover, generally, although a silica, a zeolite, etc. show alkalinity, i.e., a with a pH of 7.0 or more value, in many cases, they can be used as the coating liquid of desired pH by choosing the class of cation resin or blending pH regulators, such as an acid. Although pH of cation resin is generally 2.0 to about 8.0, it is possible by examining the class and loadings of cation resin to obtain the desired space pH. However, increasing low cation resin and the loadings of pH too much may spoil printing grace conversely, and it needs to be warned.

[0037] (75-degree surface glossiness of an ink absorbing layer) In order to realize high definition image quality which is equal to the photograph of a silver salt method and to make it a photograph tone further more, glossiness is required, and it is desirable that 75-degree surface glossiness (JIS-P8142) is 30% or more. Furthermore, it is more desirable that 75-degree surface glossiness (JIS-P8142) is 50% or more. When 75-degree surface glossiness (JIS-P8142) is less than 30%, the gloss of a photograph tone may not be acquired and target record image quality may not be acquired.

[0038] The high base material of smooth nature, such as the [manufacture approach] plastic film and RC paper, is especially used, and as a pigment, when for example, the second [an average of] particle diameter uses a detailed pigment 300nm or less, gloss is especially easy to be demonstrated. Moreover, gloss can also be further raised by supercalender processing (heat supermarket) etc. Moreover, even when the usual stencil (it is not high out of smooth nature) is used, especially if the maximum surface layer is made to form by the imprint method, it will be easy to discover gloss.

[0039] (Replica method) By drying a coating layer in tops, such as a cast drum (drums, such as a metal which carried out mirror finish, plastics, and glass) which has smooth nature, a metal plate which carried out mirror finish, a plastic sheet, and a film, a glass plate, and copying a smooth side on a coating layer, a replica method is smooth and is an approach of obtaining a glossy coating layer front face.

[0040] (The cast method) As an approach of preparing the maximum surface layer of an ink absorbing layer with a replica method To the mirror plane drum heated while coating of the coating liquid was carried out on the base material (on [when an under coat is prepared / the]) and this coating layer was in the damp or wet condition, a pressure welding, It dries, and it dries and a pressure welding and the approach (the RIWETTO cast method) of finishing are mentioned to the approach (the wet cast method) of finishing, or the mirror plane drum which once carried out after [desiccation] re-humidity and by which afterbaking was carried out. Moreover, after carrying out coating of the direct coating liquid to the heated mirror plane drum, on a base material (on [when an under coat is prepared / the]), it can dry and a pressure welding and the approach (the pre cast method) of finishing can also be adopted.

[0041] Furthermore, while carrying out coating of the coating liquid on a base material (on [when an under coat is prepared / that]), drying this coating layer to some extent and being in the condition of half-desiccation, it dries and a pressure welding and the approach of finishing are mentioned to the heated mirror plane drum. Although the half-desiccation of most fluidities of a coating layer is lost, moisture means the condition of containing mostly and is adjusted to extent to the amount of coating layer bones dry here 20 to 400% (that is, the moisture of the 20 - 400 weight section is included to the oven-

dry-weight 100 weight section of a coating layer).

[0042] To the mirror plane drum heated while coating of the coating liquid was carried out on the base material (on [when an under coat is prepared / the]) and the coating layer was in the damp or wet condition, it dries, and a pressure welding and when finishing, it is the object which obtains the coating layer of uniform and sufficient amount of coating, and the approach of promoting immobilization of coating liquid can also be taken. Blend a gelling agent which promotes immobilization of the maximum surface-layer coating liquid in for example, (1) base material or an under coat as this approach. (2) Carry out a gelling agent which promotes immobilization of the maximum surface-layer coating liquid on a base material or an under coat coating and impregnation. (3) After carrying out coating of the maximum surface-layer coating liquid, blending a gelling agent with which immobilization is promoted in the process in which coating liquid dries a gelling agent which promotes immobilization of coating liquid on a front face in coating and (4) maximum surface-layer coating liquid which carries out impregnation is mentioned. As such a gelling agent, those salts, such as a way acid, formic acid, etc. which are the cross linking agent of adhesives, such as polyvinyl alcohol in the maximum surface-layer coating liquid, and an aldehyde compound, an epoxy compound, etc. are mentioned.

[0043] (Film replica method) A film replica method is mentioned as another method of preparing the maximum surface layer of an ink absorbing layer with a replica method. Coating of the (1) coating liquid is carried out to a film replica method on a base material (on [when an under coat is prepared / the]). Once carrying out after [desiccation] re-humidity while this coating layer is in a damp or wet condition or, pile up a smooth film sheet and coating of the approach and (2) coating liquid which remove a smooth film sheet is carried out on a smooth film sheet after desiccation as it is. The approach, ***** which pile up a base material or an under coat side, and remove a smooth film sheet after desiccation as it is while this coating layer is in a damp or wet condition, or once carrying out after [desiccation] re-humidity. Moreover, in (1) and (2), where a film sheet is piled up, after not drying or drying in part, it can exfoliate and a film sheet can also be dried still more nearly thoroughly (when a film sheet can exfoliate).

[0044] (The coating approach) the case where coating of the acceptance layer mentioned above is carried out -- various kinds, such as a blade coating machine, an air knife coater, a rod blade coating machine, a roll coater, a brush coating machine, a CHAMPU REXX coating machine, a bar coating machine, a gravure coating machine, a die coating machine, and a curtain coating machine, -- well-known coating equipment can be used. although the amount of coating of an acceptance **** surface layer is based also on the lower layer amount of coating -- desiccation solid content -- 1 - 50 g/m² -- desirable -- 2 - 30 g/m² -- it is 3 - 20 g/m² more preferably. Here, in less than two 1 g/m, neither printing concentration nor gloss may fully come out, and exceeding 50 g/m², if many, effectiveness will be saturated and will become disadvantageous also in cost.

[0045] (Undercoat) An ink absorbing layer can be prepared more than two-layer. Layers other than the maximum surface layer are called undercoat. An under coat is constituted considering a pigment and adhesives as a principal component. Although a detailed pigment may be used for the pigment in undercoat, particle diameter may use an oversized thing from what was used by the maximum surface layer. When undercoat is prepared more than two-layer and a detailed pigment is used for the maximum surface layer, as for the lowest layer at least, it is more desirable than what was used by the

maximum surface layer to use an oversized thing. In this case, it is easy to excel in absorption capacity and rate of absorption. in order to acquire gloss, without adopting an imprint method -- the smooth nature on the front face of undercoat -- a certain extent -- since it needs to be high, the second [an average of] particle diameter of the pigment of undercoat has desirable 1 micrometer or less.

[0046] As a pigment of undercoat, specifically For example, an alumina, a kaolin, clay, Baking clay, amorphous silica, a zinc oxide, an aluminum hydroxide, a calcium carbonate, A satin white, aluminum silicate, an alumina, colloidal silica, A zeolite, permutite, sepiolite, a smectite, a synthetic smectite, A magnesium silicate, a magnesium carbonate, a magnesium oxide, diatomaceous earth, The various pigments of well-known official business can use together one sort or more than it in the common coated paper manufacture fields, such as a styrene system plastics pigment, a hydrotalcite, a urea-resin system plastics pigment, and a benzoguanamine system plastics pigment. It is desirable to use the high amorphous silica of ink absorptivity, an alumina, and a zeolite as a principal component also in these.

[0047] the conventionally well-known adhesives generally used [latexes /, such as a conjugated diene system polymer latex of cellulose, such as various starch, such as protein, such as casein, soybean protein, and synthetic protein, starch, and oxidation starch, polyvinyl alcohol, a carboxymethyl cellulose, and methyl cellulose, a styrene-butadiene copolymer, and a methyl methacrylate-butadiene copolymer, an acrylic polymer latex, and an ethylene-vinylacetate copolymer, / vinyl system polymer] as an object for coated paper as undercoat adhesives -- independence -- or it is used together and used. although the blending ratio of coal of a pigment and adhesives is based also on the class -- general -- the pigment 100 weight section -- receiving -- adhesives 1 - the 100 weight sections -- it is preferably adjusted in the range of 2 - 50 weight section. In addition, various assistants, such as a dispersant used in manufacture of common coated paper, a thickener, a defoaming agent, an antistatic agent, and antiseptics, are added suitably. Fluorescent dye and a coloring agent can also be added in an under coat.

[0048] Into undercoat, a cationic compound can be blended in order to establish the color component in the ink for ink jet record. When the particle diameter of the pigment in undercoat is to some extent large, the direction fixed as much as possible to the maximum surface layer prepared on an under coat is the inclination for printing (record) concentration to become high, and, as for an ink color, for that, it is more desirable than the inside of an under coat to blend many cationic compounds into the maximum surface layer. Since printing concentration cannot fall easily even if established in undercoat when [that the particle diameter of the pigment in undercoat is sufficiently small] transparency is high, it does not become a problem even if it blends a cationic compound into undercoat.

[0049] a blank paper -- although the front face pH of the maximum surface layer is important and is not limited especially about lower layer pH, since the base material front face pH and the lower layer front face pH affect the front face pH of the maximum surface layer, it is necessary to adjust yellowing suitably

[0050] the constituent for undercoat constituted with the above-mentioned ingredient -- general -- solid content concentration -- about 5 - 50 % of the weight -- adjusting -- a base material top -- dry weight -- 2 - 100 g/m² -- preferably, about two 5 - 50 g/m, coating is carried out so that it may become about two 10 - 30 g/m still more preferably. However,

when preparing undercoat more than two-layer, the amount of coating can be adjusted suitably. When many [ink absorptivity may be inferior, or if there are few amounts of coating, when a gloss layer is prepared, gloss may not fully come out, and], printing concentration falls, or the reinforcement of a coating layer falls and powder omission and a blemish become easy to be attached here. the coating equipment of the various well-known official businesses as the coating of the maximum surface layer with the same constituent for undercoat -- coating -- it dries. Furthermore, data smoothing, such as a super calender and brushing, can also be performed after desiccation of undercoat if needed. Moreover, undercoat may be manufactured by the imprint method.

[0051] The solvent which dissolves or distributes the coloring matter in which an image is made to form, and this coloring matter as ink used by the ink jet record approach of [ink] this invention is used as an indispensable component, and various assistants, such as the dissolution of various dispersants, a surfactant, a viscosity controlling agent, a specific resistance regulator, pH regulator, an antifungal agent, and record material or a distributed stabilizing agent, are added suitably if needed. As a record agent used for ink, although direct dye, acid dye, basic dye, reactive dye, a food color, a disperse dye, fat dye, various pigments, etc. are mentioned, a well-known record agent can be conventionally used especially without a limit. Although the content of the above-mentioned coloring matter is determined by the class of solvent component, the property required of ink, also in the ink in this invention, there is especially no problem at the combination in conventional ink, i.e., about 0.1 - 20% of the weight of an activity.

[0052] As a solvent of the ink used by this invention, water and water-soluble, various organic solvents, For example, methyl alcohol, ethyl alcohol, n-propyl alcohol, The alkyl alcohols of the carbon numbers 1-4 of isopropyl alcohol, n-butyl alcohol, isobutyl alcohol, etc., A ketone or ketone alcohol, such as an acetone and diacetone alcohol, Polyalkylene glycols, such as a polyethylene glycol and a polypropylene glycol Ethylene glycol, propylene glycol, a butylene glycol, Triethylene glycol, thiodiglycol, hexylene glycol, Alkylene groups, such as a diethylene glycol, 2-6 alkylene glycol Ether, such as amides, such as dimethylformamide, and a tetrahydrofuran, There is low-grade alkyl ether of polyhydric alcohol, such as a glycerol, ethylene glycol methyl ether, the diethylene-glycol methyl (ethyl) ether, and the triethylene glycol monomethyl ether.

[0053] Although the above described color ink, pigment type ink is also spreading in recent years. Although pigment ink is generally inferior to color ink in the clear nature of coloring, it has the advantage which is excellent in the water resisting property of a record image, and lightfastness. Pigment ink is ink which made the solvent, i.e., water, or/and the organic solvent distribute organic or an inorganic pigment particle component.

[0054] As an organic solvent, for example, methyl alcohol, ethyl alcohol, n-propyl alcohol, The alkyl alcohols of the carbon numbers 1-4 of isopropyl alcohol, n-butyl alcohol, isobutyl alcohol, etc., A ketone or ketone alcohol, such as an acetone and diacetone alcohol, Polyalkylene glycols, such as a polyethylene glycol and a polypropylene glycol Ethylene glycol, a polypropylene glycol, a butylene glycol, triethylene glycol and thiodiglycol -- passing -- a xylene glycol -- Alkylene groups, such as a diethylene glycol, 2-6 alkylene glycol Ether, such as amides, such as dimethylformamide, and a tetrahydrofuran, The low-grade alkyl ether of polyhydric alcohol, such as a glycerol, ethylene glycol methyl ether, the diethylene-glycol methyl (ethyl) ether, and the triethylene glycol monomethyl ether, and paraffin hydrocarbon

(ISO) are mentioned. That to which the thing using the solvent which uses water as a principal component used watercolor pigment ink and an oily solvent as the principal component in the above is oily pigment ink.

[0055] As an organic pigment, pigments, such as an azo system, a phthalocyanine system, a pel phosphorus system, an isoindolinone system, an imidazolone system, a pyran SURON system, and a thioindigo system, can be illustrated, for example. As an inorganic pigment for example Carbon black, graphite, synthetic ferrous-oxide yellow, transparency red ocher, titan yellow, Pigments, such as a MORIBUTE toe range, a cuprous oxide, cobalt blue, ultramarine blue, C.I.Pigment Yellow (yellow), C.I.Pigment Blue (cyanogen), and C.I.Pigment Red (Magenta), can be illustrated.

[0056] As said dispersant, various surfactants, a low-molecular-weight dispersant, and the dispersant of the resin system which has a hydrophilic functional group and a hydrophobic functional group are used. Moreover, aqueous resin can also be added in order to raise fixable [which adjust the viscosity of ink / the object or fixable].

[0057] Blending said pigment and dispersant into a solution, grinding to a detailed particulate material using dispersers, such as a paint shaker and a sand mill, filtering a big and rough particle with the filter of 1.0 micrometers or less of apertures, and considering as pigment ink is usually performed. Although especially the solid content concentration of pigment ink is not limited, it is 0.5 - 30 % of the weight. Moreover, generally the mean particle diameter of the pigment distributed in pigment ink is about 50-500nm.

[0058]

[Example] Although an example is given to below and this invention is explained more concretely, of course, it is not limited to these. Moreover, the section in an example and especially % show weight section and weight %, respectively, unless it refuses.

[0059] [Production of a base material]

((A) Base material) The pulp slurry of 0.5% of concentration which consists of the broad-leaved-tree-bleached-kraft-pulp (LBKP;CSF500ml) 100 section, the ANSI REXX (baking kaolin) 10 section, the commercial sizing compound 0.05 section, the sulfuric-acid band 1.5 section, the humid paper durability agent 0.5 sections, and the starch 0.75 section was prepared. Paper making of this pulp slurry was carried out with the Fortlinear paper machine, and the paper base of through, basis weight 120 g/m², and bulk density 0.80 g/cm³ was manufactured for the dryer and the machine calender. The Stockigt sizing degree of this paper base was 10 seconds. The front face pH of this paper base was 3.5.

[0060] ((B) Base material) The pulp slurry of 0.5% of concentration which consists of the broad-leaved-tree-bleached-kraft-pulp (LBKP;CSF400ml) 100 section, the precipitated-calcium-carbonate 20 section, the cation-ized starch 1 section, and the anhydrous alkenyl succinic-acid system neutral sizing compound 0.2 section was prepared. Paper making of this pulp slurry was carried out with the Fortlinear paper machine, and the paper base of through, basis weight 120 g/m², and bulk density 0.80 g/cm³ was manufactured for the dryer and the machine calender. The Stockigt sizing degree of this paper base was 50 seconds. The front face pH of this paper base was 8.0.

[0061] ((C) Base material) The needle-leaved tree bleached kraft pulp (NBKP) in which CSF (JIS P-8121) carried out beating to 250ml, and the broad-leaved tree bleached kraft pulp (LBKP) in which CSF carried out beating to 280ml were mixed at a rate of the weight ratio 2:8, and the pulp slurry of 0.5% of concentration was prepared. 0.1% of

anion-ized polyacrylamide resin and 0.7% of polyamide polyamine epichlorohydrin resins are added 2.0% of cation-ized starch, and alkyl ketene dimer 0.4% to pulp oven dry weight, and it fully stirred and was made to distribute in this pulp slurry. Paper making of the pulp slurry of the above-mentioned presentation was carried out by the long network machine, and the stencil of through, the basis weight of 180g/m², and bulk density 1.0 g/cm³ was manufactured for a dryer, size press, and a machine calender. The size press liquid used for the above-mentioned size press process mixed carboxyl denaturation polyvinyl alcohol and a sodium chloride by the weight ratio of 2:1, added this to water, carried out the heating dissolution, it is what was prepared to 5% of concentration, and it totaled this to both sides of paper, applied it two times in 25ml /, and obtained the stencil. [0062] After performing corona discharge treatment to both sides of this stencil, the following polyolefin resin constituent 1 (resin constituent for front faces) which carried out mixed distribution with the Banbury mixer is made for the amount of coating to be on the felt side side of a stencil to 25 g/m². Moreover, as the amount of coating was on the wire side side to 20 g/m² about the polyolefin resin constituent 2 (resin constituent for rear faces), it applied with the melting extruder (melting temperature of 320 degrees C) which has T mold die, and the felt side was carried out in the mirror plane, and cooling solidification of the wire side was carried out with the cooling roll of a split face. Next, after performing corona discharge treatment on a surface coating side, coating of the following support layer was carried out in the gravure coating machine so that it might be set to 0.3g/m² with dry weight. As for the obtained base material A, the smoothness by the side of a front face (Oken type, J.TAPPI No.5) was [the opacity (JIS P8138) of the front face pH] 6.5 93% for 6000 seconds.

[0063] The long-chain mold low-density-polyethylene resin (consistency 0.926g/cm³ and melt index 20g / 10 minutes) 35 section, (Polyolefin resin constituent 1) The low-density-polyethylene resin (consistency 0.919g/cm³ and melt index 2g / 10 minutes) 50 section, The anatase mold titanium-dioxide (Ishihara Sangyo [Kaisha, Ltd.] make trade name: A-220) 15 section, The zinc stearate 0.1 section, the anti-oxidant (Ciba-Geigy make, trade name:Irganox1010) 0.03 section, The ultramarine blue (shrine make trade name: the first formation blue-shade ultramarine blue No. 2000) 0.09 sections, the fluorescent brightener (Ciba-Geigy make, trade name:UVITEX alumnus) 0.3 section [0064] (Polyolefin resin constituent 2) The high-density-polyethylene resin (consistency 0.954g/cm³ and melt index 20g / 10 minutes) 65 section, the low-density-polyethylene resin (consistency 0.924 g/cm³, melt index 4g / 10 minutes) 35 section [0065] (Support layer) The gelatin (Nitta gelatin company make, trade name:G0282K) 100 section, the surfactant (Kao [Corp.] make trade name: EMARU E27C) 0.005 section [0066]

[Preparation of a silica detailed pigment]

((A) Detailed pigment) After carrying out moisture powder grinding of the commercial sedimentation method silica (X-45, particle-diameter [first / an average of] : the Tokuyama make, a trade name: fine seal about 10nm, second [an average of] particle diameter : about 4.5 micrometers) with a Sand grinder, grinding distribution was repeated using the nano mizer (nano mizer company make, a trade name: nano mizer), and 10% dispersion liquid which the second [an average of] particle diameter becomes from 0.08 micrometers were prepared after classification.

[0067] (Detailed pigment A1) After carrying out moisture powder grinding of the commercial sedimentation method silica (X-45, particle-diameter [first / an average of] :

the Tokuyama make, a trade name: fine seal about 10nm, second [an average of] particle diameter : about 4.5 micrometers) with a Sand grinder, grinding distribution was repeated using the nano mizer (nano mizer company make, a trade name: nano mizer), and 12% dispersion liquid which the second [an average of] particle diameter becomes from 0.05 micrometers were prepared after classification. The cation resin (Nitto Boseki Co., Ltd. make, trade name-AS-J-81) 5 section was added to these dispersion liquid, and condensation of a pigment and thickening of dispersion liquid were made to cause. Again, grinding distribution was repeated using the nano mizer and 10% dispersion liquid which the second [an average of] particle diameter (condensation particle size) becomes from 0.08 micrometers were prepared.

[0068] (Detailed pigment A2) It prepared like the detailed pigment A1 except having made the amount of the cation resin to add into the ten sections.

[0069] (Detailed pigment A3) The cation resin of detailed pigment A1 activity was prepared like the detailed pigment A1 except having changed to the polydiallyl quarternary-ammonium-salt acid chloride (product [made from SENKA], trade name:CP-103) 15 sections.

[0070] (Detailed pigment A4) Moisture powder grinding of the commercial sedimentation method silica (X-45, particle-diameter [first / an average of] : the Tokuyama make, a trade name: fine seal about 10nm, second [an average of] particle diameter : about 4.5 micrometers) was carried out with the Sand grinder, and 12% dispersion liquid which the second [an average of] particle diameter becomes from 1 micrometer were prepared. The cation resin (Nitto Boseki Co., Ltd. make, trade name-AS-J-81) 10 section was added to dispersion liquid, and condensation of a pigment and thickening of dispersion liquid were made to cause. Again, grinding distribution was repeated using the Sand grinder and 10% dispersion liquid which the second [an average of] particle diameter (condensation particle size) becomes from 1 micrometer were prepared.

[0071] ((B) Detailed pigment) After carrying out moisture powder grinding of the commercial gel method silica (the silo jet P612, particle-diameter [first / an average of] : the product made from grace DEBISON, trade name : about 10nm, second [an average of] particle diameter : about 7.5 micrometers) with a Sand grinder, grinding distribution was repeated using the nano mizer (nano mizer company make, a trade name: nano mizer), and 15% dispersion liquid which the second [an average of] particle diameter becomes from 0.3 micrometers were prepared after classification. The cation resin (Nitto Boseki Co., Ltd. make, trade name-AS-J-81) 10 section was added to these dispersion liquid, and condensation of a pigment and thickening of dispersion liquid were made to cause. Again, grinding distribution was repeated using the nano mizer and 12% dispersion liquid which the second [an average of] particle diameter becomes from 0.5 micrometers were prepared.

[0072] ((C) Detailed pigment) After carrying out moisture powder grinding of the commercial fumed silica (Reolosil QS- an average of [30 and specific-surface-area 300m²/g,] the Tokuyama make, a trade name, 1 primary particle diameter : about 10nm) with a Sand grinder, grinding distribution was repeated using the nano mizer and 12% dispersion liquid which the second [an average of] particle diameter after classification becomes from 0.08 micrometers were prepared. The cation resin (Nitto Boseki Co., Ltd. make, trade name-AS-J-81) 10 section was added to dispersion liquid, and condensation

of a pigment and thickening of dispersion liquid were made to cause. Again, grinding distribution was repeated using the nano mizer and 10% dispersion liquid which the second [an average of] particle diameter becomes from 0.15 micrometers were prepared. [0073] on the example 1 base material A, the following coating liquid for under coat ** is set to 10g/m² in the amount of solid content -- as -- an air knife coater -- coating -- it dried. Next, by the air knife coater, coating was carried out and the following coating liquid for under coat ** was dried so that it might be set to 5g/m² by solid content weight on above under coat **. Next, coating of the coating liquid for following maximum surface layers was carried out in the roll coater, the pressure welding was promptly carried out to the mirror plane drum whose skin temperature is 95 degrees C, after desiccation, it was made to release from mold and the gloss type ink jet record form was obtained. The amount of coating of the maximum surface layer at this time was solid content weight, and was 3 g/m².

[0074] (Coating liquid for undercoat ** (15% of solid content concentration)) pH7.5, synthetic silica (Tokuyama make trade name: fine seal X-60, second [an average of] particle diameter [of 6.0 micrometers], first [an average of] particle diameter of 15nm) 70 section, zeolite (Toso make trade name: TOYOBIRUDA and second [an average of] particle diameter of 1.5 micrometers) 30 section, and silyl denaturation polyvinyl alcohol (Kuraray [Co., Ltd.] make trade name: R1130) 20 section [0075] (Coating liquid for undercoat ** (12% of solid content concentration)) The pH7.0, the detailed pigment A 100 section, and polyvinyl alcohol (Kuraray Co., Ltd. make, trade name-VA117) 15 section [0076] (Coating liquid for the maximum surface layers (12% of solid content concentration)) pH4.5 -- the - detailed pigment A3 100 section, the polyvinyl alcohol (Kuraray Co., Ltd. make, trade name-VA117) 25 section, and octadecanamide The two sections [0077] The gloss type ink jet record form was obtained like the example 1 except having changed the detailed pigment of an example 2 maximum surface layer into A2 from A3. ((pH) The maximum surface-layer coating 5.5)

[0078] The gloss type ink jet record form was obtained like the example 1 except having changed the detailed pigment of an example 3 maximum surface layer into A1 from A3. ((pH) The maximum surface-layer coating 6.0)

[0079] The example 4 base material A was changed into the base material B, and the gloss type ink jet record form was obtained like the example 1 except having changed the detailed pigment of the maximum surface layer into A2 from A3.

[0080] The example of comparison 1 base material A was changed into the base material B, and the gloss type ink jet record form was obtained like the example 1 except having changed the detailed pigment of the maximum surface layer into A1 from A3.

[0081] The example of comparison 2 base material A was changed into the base material B, and the gloss type ink jet record form was obtained like the example 1 except having changed the detailed pigment of the maximum surface layer into A from A3. ((pH) The maximum surface-layer coating 7.5)

[0082] on the example 5 base material A, the coating liquid for under coat ** of an example 1 is set to 12g/m² with dry weight -- as -- an air knife coater -- coating -- it dried. Next, after having carried out coating by the air knife coater on the above-mentioned under coat, drying for 20 seconds with cold blast and making the following coating liquid for the maximum surface layers into half-dryness (150% of moisture regain to the amount of coating layer bones dry), the pressure welding was carried out to the

mirror plane drum whose skin temperature is 100 degrees C, after desiccation, it was made to release from mold and the gloss type ink jet record form was obtained. The amount of coating of the maximum surface layer at this time was solid content weight, and was 6 g/m².

[0083] (Coating liquid for the maximum surface layers (12% of solid content concentration)) pH5.0, the detailed pigment A2 100 section, the polyvinyl alcohol (Kuraray Co., Ltd. make, trade name-VA117) 15 section and octadecanamide The two sections [0084] The example 6 base material A was changed into the base material B, and the gloss type ink jet record form was obtained like the example 5 except having changed the detailed pigment of the maximum surface layer into A1 from A2. ((pH) The maximum surface-layer coating 5.7)

[0085] The example of comparison 3 base material A was changed into the base material B, and the gloss type ink jet record form was obtained like the example 5 except having changed the detailed pigment of the maximum surface layer into A from A2. ((pH) The maximum surface-layer coating 7.2)

[0086] The example 7 base material A was changed into the base material B, and the gloss type ink jet record form was obtained like the example 5 except having changed the detailed pigment of the maximum surface layer into A4 from A2. <((pH) The maximum surface-layer coating 5.6) BR> [0087] On the example 8 base material C, coating was carried out and the following coating liquid for undercoat was dried so that it might be set to 20g/m² with dry weight in a die coating machine. Next, coating was carried out, the following coating liquid for the maximum surface layers was dried so that it might become 6 g/m² with dry weight in a die coating machine on the above-mentioned under coat, and the gloss type ink jet record form was obtained.

[0088] (Coating liquid for undercoat (12% of solid content concentration)) The pH8.0, the detailed pigment B 100 section, and polyvinyl alcohol (Kuraray Co., Ltd. make, trade name-VA135) 17 section [0089] (Coating liquid for the maximum surface layers (10% of solid content concentration)) The pH4.5, the detailed pigment C 100 section, and polyvinyl alcohol (Kuraray Co., Ltd. make, trade name-VA135) 15 section [0090] The gloss type ink jet record form was obtained like the example 8 except having changed the detailed pigment of an example 9 maximum surface layer into A2 from C. ((pH) The maximum surface-layer coating 5.7)

[0091] [0092] which carried out coating, dried and obtained the gloss type ink jet record form on the example of comparison 4 base material C so that it might become 20 g/m² with dry weight in a die coating machine about the following coating liquid (Coating liquid (10% of solid content concentration)) The pH7.0, the detailed pigment A 100 section, and polyvinyl alcohol (Kuraray Co., Ltd. make, trade name-VA135) 15 section [0093] The ink jet record form was obtained like the example 4 of a comparison except having changed the example 10 detailed pigment into A4 from A. ((pH) The maximum surface-layer coating 5.8)

[0094] Coating and desiccation of following coating liquid ** were done in the die coating machine at the PET film (the Toray Industries, Inc. make, trade name:lumiler T50micrometer) used as an example 11 shaping side so that the amount of coating might become with 5 g/m², and further, on this layer, coating and desiccation of following coating liquid ** were done in the die coating machine so that the amount of coating might serve as 10 g/m². Next, after carrying out lamination desiccation of the following

coating liquid ** on a base material B with the coating side of the PET film which carried out coating in the bar coating machine and which was described above so that the amount of coating may be set to 2g/m², the PET film was removed and the ink jet record form of this invention was obtained.

[0095] (Coating liquid ** (12% of solid content concentration)) The pH8.0, the detailed pigment B 100 section, and polyvinyl alcohol (Kuraray Co., Ltd. make, trade name-VA135) 17 section [0096] (Coating liquid ** (10% of solid content concentration)) pH -- the 5.5, the detailed pigment A2 100 section, and polyvinyl alcohol (Kuraray Co., Ltd. make, trade name-VA135) 15 section [0097] example 12 following coating liquid ** is set to 10g/m² with dry weight on a base material A -- as -- an air knife coater -- coating -- it dried.

[0098] (Coating liquid ** (18% of solid content concentration)) pH5.5 and a synthetic silica (the Tokuyama make --) trade name: -- the first [an average of] particle diameter of 15nm 100 section, and fine seal X-60, second [an average of] particle diameter [of 6.0 micrometers], and silyl denaturation polyvinyl alcohol (the Kuraray Co., Ltd. make --) trade name: -- the R1130 20 section, the cation resin (product [made from SENKA], trade name:CP103) 15 section, and cation resin (Japanese flower chemistry company make --) Trade name: After using the roll coater and carrying out coating of the neo fix E1175 section, next the following coating liquid ** on the above-mentioned coating layer, the pressure welding was immediately carried out to the mirror plane drum whose skin temperature is 85 degrees C, after desiccation, it was made to release from mold and the gloss type ink jet record form was obtained. The amount of coating of the gloss layer at this time was solid content weight, and was 8 g/m².

[0099] (Coating liquid ** (25% of solid content concentration)) Styrene-2 methyl hexyl acrylate copolymer emulsion of pH7.5 and 75 degrees C of glass transition points (mean particle diameter of 40nm) 30 sections and colloidal silica (second [an average of] particle diameter of 30nm) 70 section, thickening, the dispersant (alkyl vinyl ether maleic-acid derivative copolymer) 5 section, the release agent (lecithin) 1.5 section, and acetic-acid 0.5 section [0100] example of comparison 5 following coating liquid ** is set to 10g/m² with dry weight on a base material B -- as -- an air knife coater -- coating -- it dried.

[0101] (Coating liquid ** (18% of solid content concentration)) pH6.0 and a synthetic silica (the Tokuyama make --) trade name: -- the first [an average of] particle diameter of 15nm 100 section, and fine seal X-60, second [an average of] particle diameter [of 6.0 micrometers], and silyl denaturation polyvinyl alcohol (the Kuraray Co., Ltd. make --) Trade name: The R1130 20 section, the cation resin (Nitto Boseki Co., Ltd. make, trade name-AS-J-81) 5 section, and cation resin (Japanese flower chemistry company make trade name: neo fix E117) 5 section [0102] Next, after using the roll coater and carrying out coating of the following coating liquid ** on the above-mentioned coating layer, the pressure welding was immediately carried out to the mirror plane drum whose skin temperature is 85 degrees C, after desiccation, it was made to release from mold and the gloss type ink jet record form was obtained. The amount of coating of the gloss layer at this time was solid content weight, and was 8 g/m².

[0103] (Coating liquid ** (25% of solid content concentration)) pH9.0 and 75 degrees C [of glass transition points] styrene-2 methyl hexyl acrylate copolymer 30 sections and colloidal silica (second [an average of] particle diameter of 30nm) The 70 sections,

thickening, the dispersant (alkyl vinyl ether maleic-acid derivative copolymer) 5 section, and release agent (lecithin) 1.5 section [0104] On the example 13 base material C, coating of the following coating liquid was carried out so that it might become 15 g/m² with dry weight in a die coating machine, and the desiccation and gloss type ink jet record form was obtained.

[0105] (Coating liquid for the maximum surface layers (10% of solid content concentration)) The pH4.5, the detailed pigment C 100 section, and polyvinyl alcohol (Kuraray Co., Ltd. make, trade name-VA135) 15 section [0106] On the example 14 base material C, coating of the following coating liquid was carried out so that it might become 20 g/m² with dry weight in a die coating machine, and the desiccation and gloss type ink jet record form was obtained.

[0107] (Coating liquid for the maximum surface layers (10% of solid content concentration)) pH -- the 5.7, the detailed pigment A2 100 section, and polyvinyl alcohol (Kuraray Co., Ltd. make, trade name-VA135) 15 section [0108] on the example of comparison 6 base material A, the following coating liquid is set to 5g/m² in the amount of solid content -- as -- an air knife coater -- coating -- it dried and the ink jet record form was obtained.

[0109] (Coating liquid (15% of solid content concentration)) pH5.5, the synthetic silica (Tokuyama make trade name: fine seal X-45, second [an average of] particle diameter [of 4.5 micrometers], first [an average of] particle diameter of 15nm) 100 section, the silyl denaturation polyvinyl alcohol (Kuraray [Co., Ltd.] make trade name: R1130) 20 section, and cation resin (product [made from SENKA], trade name:CP103) 15 section [0110] on the example of comparison 7 base material B, the following coating liquid is set to 5g/m² in the amount of solid content -- as -- an air knife coater -- coating -- it dried and the ink jet record form was obtained.

[0111] (Coating liquid (15% of solid content concentration)) pH7.5 and a synthetic silica (the Tokuyama make --) trade name: -- the fine seal X-45, the second [an average of] particle diameter of 4.5 micrometers, and the first [an average of] particle diameter of 15nm 70 section and a zeolite (the Toso make --) Trade name: TOYOBIRUDA, diameter of average aggregated particle 1.5micrometer30 section, silyl denaturation polyvinyl alcohol (Kuraray [Co., Ltd.] make trade name: R1130) 20 section, cation resin (Nitto Boseki Co., Ltd. make, trade name-AS-J-81) 5 section, and ammonia 0.5 section [0112] The example of reference 1 base material A was used as it was.

[0113] Thus, the quality of the obtained ink jet record form was shown in a table 1. In addition, the approach like the following estimated the above-mentioned assessment.

[0114] [Surface pH of maximum surface layer of ink absorbing layer] JAPAN TAPPI It measured based on the "2.1 applying method" in the surface pH test method of No.6"paper and the paper board." However, the premise [permeating an ink absorbing layer], after [after applying the indicator solution for pH measurement (the Kioritz Institute of Physical and Chemical Research make) to a front face] 1 - 2 minutes, the place of a judgment was judged with the pH standard discoloration table after 5 - 10 seconds, and was used as the front face pH.

[0115] [blank paper -- yellowing --] blank paper sample was inserted in the commercial plastics (product made from polypropylene) transparence file, and was left for seven days at 60 degrees C. The color difference (L*, a*, b*) of the record stratification plane before and behind processing was measured, and difference = Δ b* of b* before and behind

processing] * was computed.

O :deltab* is 0.4 or less and yellowing is not known.

O It is the level which :deltab* is 0.5-0.9 and most yellowing does not understand.

** : Level which whose deltab* is 1.0-1.6 and yellowing worries practically.

x : Level which whose deltab* is 1.7 or more and yellowing worries considerably.

[0116] According to [blank paper glossiness] JIS-P8142, 75-degree gloss of the blank paper section was measured.

[0117] It printed using [ink jet record fitness] ink jet printer PM770C (Seiko Epson make).

[0118] (Homogeneity of the solid printing section) Viewing estimated the printing nonuniformity (shade nonuniformity) of the solid printing section of 2 color mixing of cyanogen ink and Magenta ink.

O : it does not see but printing nonuniformity is good level.

O Level ** which does not pose a problem practically although there is -:printing nonuniformity a little : level from which there is printing nonuniformity a little and it poses a problem a little practically.

x : Level which printing nonuniformity is conspicuous and poses a problem practically.

[0119] (Printing NIJIMI) The solid printing section of black, cyanogen, a Magenta, and each color ink of yellow was printed so that the boundary section might touch mutually, and viewing estimated NIJIMI in a boundary.

O : it does not see but NIJIMI is good level.

O - : level from which level **:NIJIMI which does not pose a problem practically is a little conspicuous, and poses a problem a little practically although there is NIJIMI a little.

x : Level which NIJIMI is conspicuous and poses a problem practically.

[0120] (Printing concentration after ink jet record) The printing concentration of a black solid printing part is measured by Macbeth RD-914.

[0121] (Printing water resisting property) After hanging down and seasoning naturally water with several drop dropper on the boundary of the solid printing section of black, cyanogen, a Magenta, and each color ink of yellow, and the blank paper section, viewing estimated the blot of ink.

O : it does not see but NIJIMI is good level.

O : level from which level O -:NIJIMI which does not pose a problem practically is a little conspicuous, and poses a problem a little practically although there is NIJIMI a little.

x : Level which NIJIMI is conspicuous and poses a problem practically.

[0122]

[A table 1]

	支持体	表面pH	白紙 黄変	白紙 光沢度	印字品位			
					均一性	濃淡	印字 濃度	印字 耐水性
実施例1	A	3.9	◎	76	○	○	2.20	◎
実施例2	A	5.0	◎	76	○	○	2.25	○
実施例3	A	6.1	○	73	○	○	2.20	○-
実施例4	B	6.4	○	76	○	○	2.25	○
比較例1	B	7.9	×	73	○	○	2.20	○-
比較例2	B	7.7	○	60	○	○-	1.75	×
実施例5	A	4.5	◎	60	○	○	2.15	◎
実施例6	B	7.3	△	58	○	○	2.10	○-
比較例3	B	7.6	○	38	○	○-	1.75	×
実施例7	B	6.5	◎	34	○	○	1.85	○
実施例8	C	6.0	○	54	○	○-	2.45	○
実施例9	C	6.8	○	45	○	○-	2.35	○
比較例4	C	8.0	×	48	△	△	2.20	×
実施例10	C	6.5	○	25	△	△	1.95	○
実施例11	B	6.0	○	66	○	○	2.40	○
実施例12	A	7.1	△	75	○	○	1.75	○
比較例5	B	8.5	×	74	○	○	1.65	○-
実施例13	C	4.8	◎	66	△	△	2.45	◎
実施例14	C	6.0	◎	46	○-	○-	2.35	◎
比較例6	A	6.5	◎	4	○	○	1.75	◎
比較例7	B	7.9	×	4	○	○	1.65	○-
参考例1	A	3.5	◎	8	×	×	1.25	×

[0123]

[Effect of the Invention] The ink jet record form obtained by this invention is excellent in ink jet record fitness, such as printing concentration and record image quality, and excellent in especially shelf life (blank paper-proof xanthochroism) so that clearly from the result of a table 1.